Errata

Title & Document Type: 8516A S-Parameter Test Set Op. & Svc. Manual

Manual Part Number: 08516-90069

Revision Date: March 12, 1998

HP References in this Manual

This manual may contain references to HP or Hewlett-Packard. Please note that Hewlett-Packard's former test and measurement business is now part of Agilent Technologies. We have made no changes to this manual copy. The 8516A referred to in this document is now obsolete, as is the 8510 Network Analyzer.

About this Manual

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Search for the model number of this product, and the resulting product page will guide you to any available information. Our service centers may be able to perform calibration if no repair parts are needed, but no other support from Agilent is available.

Agilent Technologies

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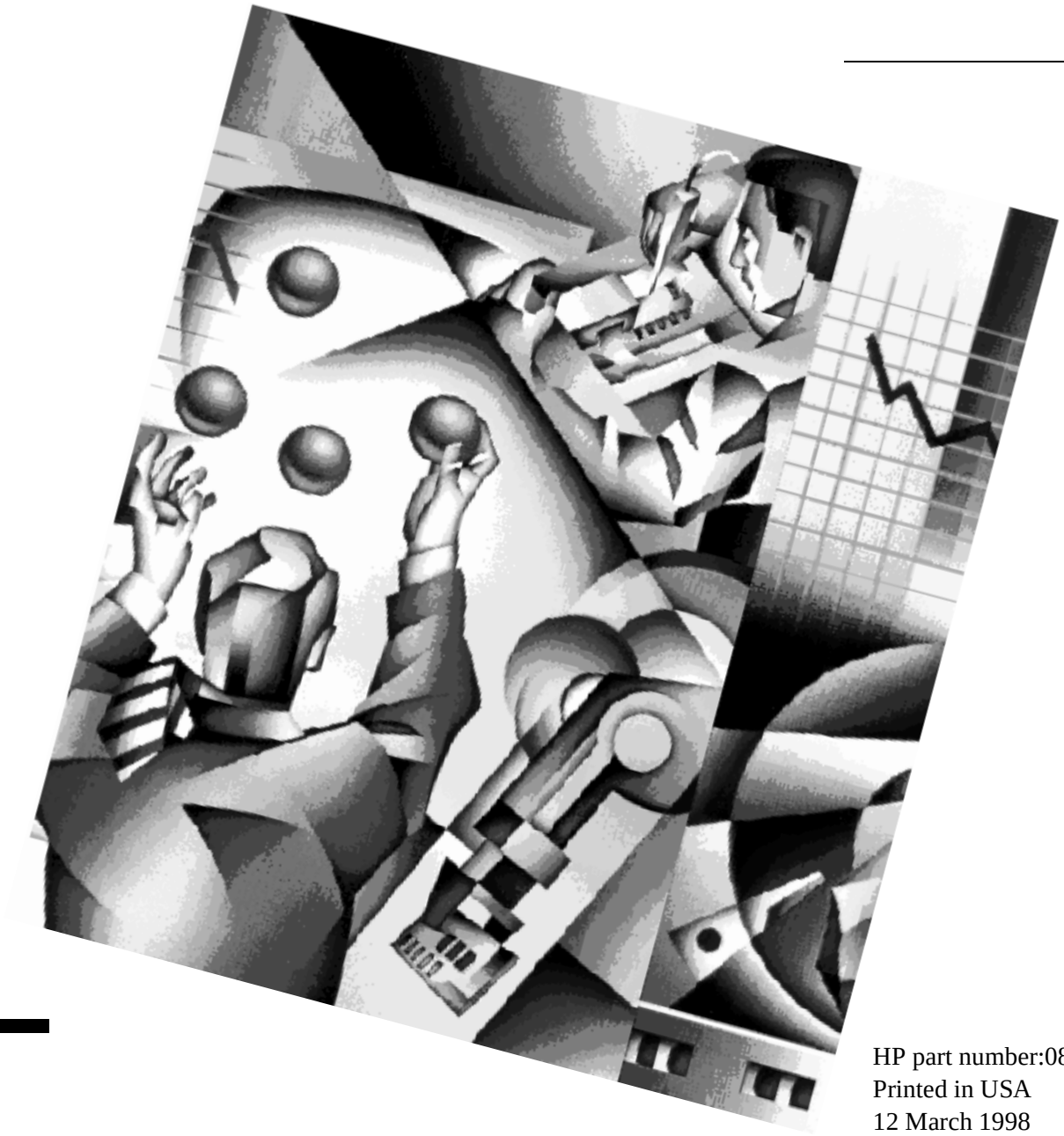
HEWLETT PACKARD

HP 8516A
S-Parameter Test Set

Operating and
Service Manual



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Revision 2

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What You'll Find in This Manual…

Part 1
- Test set description and installation information

Part 2
- Principles of operation and specifications

Part 3
- Troubleshooting, replacement procedures, and replaceable parts information

Warranty

Custom systems are warranted by contractual agreement between Hewlett-Packard Company and the Customer.

Certification

Hewlett-Packard Company certifies that this product met its published specifications at the time of shipment from the factory. Hewlett-Packard further certifies that its calibration measurements are traceable to the United States National Institute of Standards and Technology (NIST, formerly NBS), to the extent allowed by the Institute's calibration facility, and to the calibration facilities of other International Standards Organization members.

Warranty

This Hewlett-Packard system product is warranted against defects in materials and workmanship for a period corresponding to the individual warranty periods of its component products. Instruments are warranted for a period of one year. During the warranty period, Hewlett-Packard Company will, at its option, either repair or replace products that prove to be defective.

Warranty service for products installed by HP and certain other products designated by HP will be performed at Buyer's facility at no charge within HP service travel areas. Outside HP service travel areas, warranty service will be performed at Buyer's facility only upon HP's prior agreement and Buyer shall pay HP's round trip travel expenses. In all other areas, products must be returned to a service facility designated by HP.

For products returned to HP for warranty service, Buyer shall prepay shipping charges to HP and HP shall pay shipping charges to return the product to Buyer. However, Buyer shall pay all shipping charges, duties, and taxes for products returned to HP from another country.

HP warrants that its software and firmware designated by HP for use with an instrument will execute its programming instructions when properly installed on that instrument. HP does not warrant that the operation of the instrument, or software, or firmware will be uninterrupted or error free.

LIMITATION OF WARRANTY. The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance by Buyer, Buyer-supplied software or interfacing, unauthorized modification or misuse, operation outside of the environmental specifications for the product, or improper site preparation or maintenance.

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Assistance

Product maintenance agreements and other customer assistance agreements are available for Hewlett-Packard products.

For assistance, call your local Hewlett-Packard Sales and Service Office (refer to "Service and Support" on page vi).

Service and Support

Any adjustment, maintenance, or repair of this product must be performed by qualified personnel. Contact your customer engineer through your local HP Service Center. You can find a list of HP Service Centers on the web at `http://www.hp.com/go/tmdir`.

If you do not have access to the Internet, one of these HP centers can direct you to your nearest HP representative:

United States:	Hewlett-Packard Company Test and Measurement Call Center PO Box 4026 Englewood, CO 80155-4026 (800) 452 4844 (toll-free in US)
Canada:	Hewlett-Packard Canada Ltd. 5150 Spectrum Way Mississauga, Ontario L4W 5G1 (905) 206 4725
Europe:	Hewlett-Packard European Marketing Centre Postbox 999 1180 AZ Amstelveen The Netherlands (31 20) 547 9900
Japan:	Hewlett-Packard Ltd. Measurement Assistance Center 9-1, Takakura-Cho, Hachioji-Shi Tokyo 192, Japan (81) 426 56 7832 (81) 426 56 7840 (FAX)
Latin America:	Hewlett-Packard Latin American Region Headquarters 5200 Blue Lagoon Drive, 9th Floor Miami, Florida 33126, U.S.A. (305) 267 4245, (305) 267-4220 (305) 267 4288 (FAX)
Australia/New Zealand:	Hewlett-Packard Australia Ltd. 31-41 Joseph Street Blackburn, Victoria 3130 Australia 1 800 629 485 (Australia) 0800 738 378 (New Zealand) (61 3) 9210 5489 (FAX)
Asia-Pacific:	Hewlett-Packard Asia Pacific Ltd. 17-21/F Shell Tower, Times Square 1 Matheson Street, Causeway Bay Hong Kong (852) 2599 7777 (852) 2506 9285 (FAX)

Safety and Regulatory Information

Review this product and related documentation to familiarize yourself with safety markings and instructions before you operate the instrument. This product has been designed and tested in accordance with international standards.

WARNING

The WARNING notice denotes a hazard. It calls attention to a procedure, practice, or the like, that, if not correctly performed or adhered to, could result in personal injury. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

CAUTION

The **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like, which, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

Instrument Markings

	When you see this symbol on your instrument, you should refer to the instrument's instruction manual for important information.
	This symbol indicates hazardous voltages.
	The laser radiation symbol is marked on products that have a laser output.
	This symbol indicates that the instrument requires alternating current (ac) input.
	The CE mark is a registered trademark of the European Community. If it is accompanied by a year, it indicates the year the design was proven.
	The CSA mark is a registered trademark of the Canadian Standards Association.

1SM1-A	This text indicates that the instrument is an Industrial Scientific and Medical Group 1 Class A product (CISPER 11, Clause 4).
	This symbol indicates that the power line switch is ON.
	This symbol indicates that the power line switch is OFF or in STANDBY position.

Safety Earth Ground

This is a Safety Class I product (provided with a protective earthing terminal). An uninterruptible safety earth ground must be provided from the main power source to the product input wiring terminals, power cord, or supplied power cord set. Whenever it is likely that the protection has been impaired, the product must be made inoperative and secured against any unintended operation.

Before Applying Power

Verify that the product is configured to match the available main power source as described in the input power configuration instructions in this manual. If this product is to be powered by autotransformer, make sure the common terminal is connected to the neutral (grounded) side of the ac power supply.

Typeface Conventions

Not all of the following conventions may appear within this manual, however, refer to this listing whenever you encounter on of the special font characters.

Italics

- Used to emphasize important information:
  Use this software *only* with the HP 8516A Test Set.
- Used for the title of a publication:
  Refer to the *HP 8516A S-Parameter Test Set Manual*
- Used to indicate a variable:
  Type `LOAD BIN` *filename*.

`Instrument Display`

- Used to show on-screen prompts and messages that you will see on the display of an instrument:
  The HP 8516A will display the message **`CAL1 SAVED`**.

Keycap

- Used for labeled keys on the front panel of an instrument or on a computer keyboard:
  Press **Return**.

Softkey

- Used for simulated keys that appear on an instrument display:
  Press ***Prior Menu***.

`User Entry`

- Used to indicate text that you will enter using the computer keyboard; text shown in this typeface must be typed *exactly* as printed:
  Type `LOAD PARMFILE`
- Used for examples of programming code:

```
#endif // ifndef NO_CLASS
```

`Path Name`

- Used for a subdirectory name or file path:
  Edit the file *`usr/local/bin/sample.txt`*

Computer Display

- Used to show messages, prompts, and window labels that appear on a computer monitor:
  The **Edit Parameters** window will appear on the screen.
- Used for menus, lists, dialog boxes, and button boxes on a computer monitor from which you make selections using the mouse or keyboard:
  Double-click **EXIT** to quit the program.

1 General Information

The purpose of this manual is to enable you to use the HP 8516A S-Parameter test set effectively and confidently. The test set is an integral component of the HP 8510B/C measurement system. General Information includes the following topics:

- "How to Use this Manual" on page 1-2
- "Description of the Instrument" on page 1-3
- "Options of the HP 8515A Test Set" on page 1-4
- "Operating and Safety Precautions" on page 1-7

Getting Started

The contents of this manual are to be an integral part of the HP 8510B/C system documentation. For that reason, this manual is divided into the following sections. Insert these sections into the HP 8510B/C service manual (if you do not have the HP 8510B/C manual set, keep the contents of this manual within this binder):

- Installation, operation and instrument characteristics (*Insert into the HP 8510B/C Test Set and Accessories Manual "Test Set" section.*)
- Replaceable parts, service and replacement procedures (*Insert into the HP 8510B/C Service Manual "Operating" section.*)

How to Use this Manual

The HP 8515A is designed to operate specifically with the HP 8510B/C Network Analyzer. Refer to the list below for the location of information in this manual:

- To install the instrument, go to Chapter 2, “Installation”
- To check for proper operation of the test set, go to Chapter 3, “Test Set Operation” and review “Performing the Operator's Check” on page 3-5.
- To find the specifications, refer to Specifications in the *HP 8510B/C System Manual*. See Chapter 4 in this manual for operating characteristics of the test set.
- To verify that the instrument meets its published specifications, refer to Performance Tests in the *HP 8510B/C System Manual*.
- To troubleshoot the test set, refer to Service Overview and the Test Set Troubleshooting section of the *HP 8510B/C Service Manua*. Otherwise, call a Hewlett-Packard sales and service office. Phone numbers and addresses for the offices are listed in the front section under “Service and Support” on page vi.

Instruments Supported by This Manual

A label imprinted with a two-part serial number is attached to the rear panel of the test set. The first part is the serial-number prefix, and the second part is the suffix. See The two parts of the serial number contain the following information:

- The prefix includes the first four digits of the serial number, plus the letter. The contents of this manual apply directly to test sets with the same serial number prefix as the one(s) on the title page.
- The suffix includes the last five digits of the serial number, which is sequential and unique to each test set. You will need this part of the number to report test-set problems to an HP sales and service engineer.

If your test set’s serial number prefix is not listed on the title page of this manual, your instrument differs from those that are documented here.

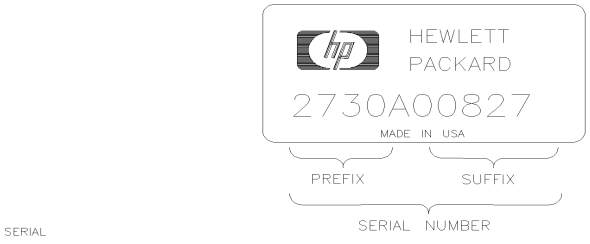


Figure 1-1 Serial Number Label Example

Instrument Compatibility

The HP 8516A is compatible with HP 8510B/C Network Analyzers with firmware revision B.04.0X and higher and HP 8340A/B or HP 8341A/B synthesizers with firmware revision 11 MAY 88 and later. Additionally, your HP 8340A/B or HP 8341A/B synthesizers must have a serial number prefix of 2812A or higher. If your network analyzer and/or HP 834XX source do not fulfill the above conditions, it is necessary to upgrade your system to work with the HP 8516A. Consult with your Hewlett-Packard representative for more information.

Measurement Accuracy

Any precision measurement is no better than the calibration of your network analyzer. As a general rule, the shorter the time between a calibration and the measurement of a device-under-test (DUT), the more precise the measurement will be, within the limitations of your system. For this reason Hewlett-Packard recommends that for precision measurements, you recalibrate your system every two hours, or at a minimum, you re-verify your system calibration.

Description of the Instrument

The HP 8516A test set combined with the HP 8510B/C network analyzer and an HP 834XX source provide a system for making S-parameter measurements over a 45 MHz to 40 GHz frequency range. An example of a test system setup is shown in Figure 1-2.

In the standard configuration, this system is particularly suited for making measurements on two port devices without having to physically reverse the DUT (device-under-test) to measure all four S-parameters. It is useful for measuring non-reciprocal devices or components like transistors, amplifiers or isolators where S_{12} measurements are important.

The HP 8516A uses two directional couplers for signal separation. For measurements of active devices, the HP 8516A includes two bias tees for applying external dc bias to both test port center conductors.

In the High Forward Dynamic Range Configuration (Option 003):

- The Port 2 coupler is reversed to optimize dynamic range in the forward measurement direction.
- The b2 sampler is connected to the coupler main arm path instead of the coupled arm so that the b2 power level is higher than the b1 power level.
- Is a better configuration for wide dynamic range or reciprocal device or component measurements (for example, filters, cables or antennas) where S_{12} is generally not measured. (However, because there is less isolation between the b2 sampler and Port 2, "sampler bounce," appearing as an occasional spurious response (spike) related to the VTO frequency, can be noticeable.)

Sampler bounce spikes are reduced when measuring well matched devices, such as terminations or attenuators, because the effects of instantaneous sampler mismatch are reduced by the return loss of the device-under-test. Sampler bounce effects can also be reduced by placing attenuation between the sampler and device-under-test in front of the test port.

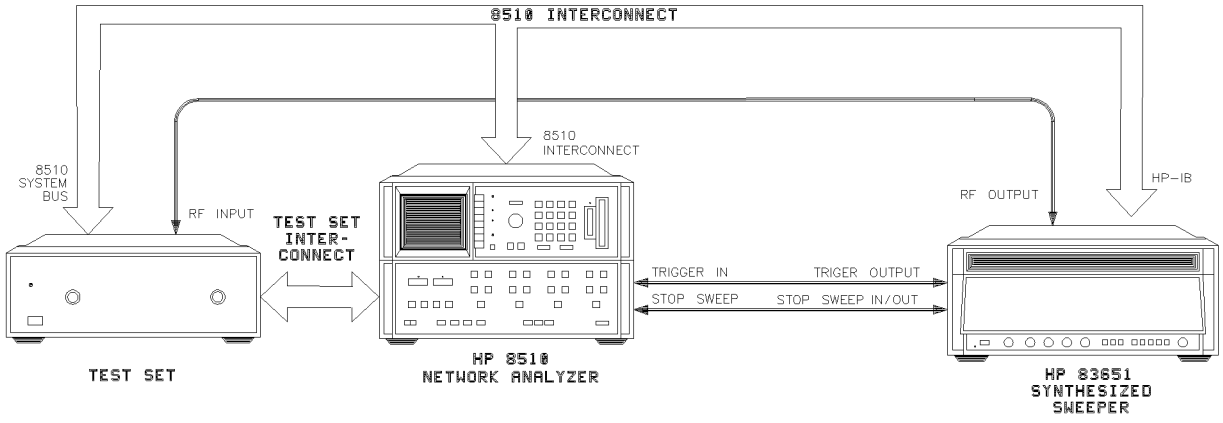


Figure 1-2 Typical HP 8516A Measurement Setup

HP 8516A Test Set Options

Table 1-1 Test Set Options and Descriptions

Option Number	Description
Option 001	This option adds IF switching capability to allow up to four test sets to be connected to the HP 8510B/C at the same time. The test set in use is selected from the HP 8510B/C. The 20 MHz IF signal is transmitted from the standard test set through the Option 001 test set(s) to the network analyzer. IF switching is performed automatically by the Option 001 test set(s), without reconnections. Only one HP 8516A may be used in this configuration. For more information refer to “Controlling Multiple Test Sets” on page 3-5 of this manual.
Option 002	This option deletes the programmable attenuators and bias tees. Note that bias can be applied externally, using the HP 11612A bias tee, if bias is required but attenuation is not.
Option 003	High Forward Dynamic Range Configuration. This option is described in detail in “Instrument Description and Operating Characteristics” on page 1-4.
Option 002/003	This option is a combination of Option 002 and Option 003, which were previously described.
Option 908	This option supplies the test set with the parts required to rack mount it with handles removed. Refer to the Installation section of this manual for additional information.
Option 910	This option provides a duplicate test set manual.
Option 913	This option supplies the test set with the parts required to rack mount it with handles. Refer to the Installation section of this manual for additional information.

Accessories

Accessories Supplied

The accessories supplied with the HP 8516A, including part numbers, are listed in the Installation and Replaceable Parts sections of this manual.

Accessories Available

Test set accessories include calibration and verification kits as well as cables and adapters to use while making measurements.

NOTE

Additional HP 8510B/C system accessory information is located in the HP 8510B/C manual set.

The calibration kits suitable for calibrating an HP 8510/8516A system when making error corrected measurements are listed in Table 1-2. Each calibration kit includes a set of precision standards to calibrate an HP 8510B/C system in the interface indicated. For additional information, review the System and Documentation Overview section of the *HP 8510B/C System Manual*.

Table 1-2 HP 8516A Test Set Accessories

Accessory Type	Accessory Model Number	Contents or Description
Calibration and Verification Kits	HP 85056A 2.4 mm Calibration Kit	This kit contains open and short circuits; fixed and (2) sliding loads, 2.4 mm to 2.4 mm adapters, connector tools and gauges for 2.4 mm connectors.
	HP 85057A 2.4 mm Verification Kit	This kit contains precision airline, mismatched airline, 20 dB and 40 dB attenuators with NBS traceable data and uncertainties.

Table 1-2 HP 8516A Test Set Accessories

Accessory Type	Accessory Model Number	Contents or Description
Cables	HP 85133C 2.4 mm Test Port Return Cable	For measurements where a 2.4 mm device-under-test is connected directly to Port 1 of the test set. The test port return cable is connected between the device-under-test and Port 2.
	HP 85133D 2.4 mm Test Port Return Cable Set	For measurements where the 2.4 mm device-under-test is connected between the cable ends.
	HP 85134C 3.5 mm Test Port Return Cable	For measurements where one end of a 3.5 mm device-under-test is connected directly to a HP 85130F adapter on Port 1. The test port return cable is connected between the device-under-test and Port 2.
	HP 85133D 2.4 mm Test Port Return Cable Set	For measurements where the 2.4 mm device-under-test is connected between the cable ends.
	HP 85134C 3.5 mm Test Port Return Cable	For measurements where one end of a 3.5 mm device-under-test is connected directly to a HP 85130F adapter on Port 1. The test port return cable is connected between the device-under-test and Port 2.
	HP 85134D 3.5 mm Test Port Return Cable Set	For measurements where a 3.5 mm device-under-test is connected between the cable ends.
	HP 85134E 3.5 mm Flexible Test Port Return Cable	For measurements where one end of a 3.5 mm device-under-test is connected directly to a HP 85130F adapter on Port 1. The test port return cable is connected between the device-under-test and Port 2.
	HP 85134F 3.5 mm Flexible Test Port Return Cable Set	For measurements where a 3.5 mm device-under-test is connected between cable ends.
	HP 85135C 7 mm Test Port Return Cable	For measurements where one end of a 7 mm device-under-test is connected directly to a HP 85130E adapter on Port 1. The test port return cable is connected between the device-under-test and Port 2.

Table 1-2 HP 8516A Test Set Accessories

Accessory Type	Accessory Model Number	Contents or Description
Cables, Continued	HP 85135D 7 mm Test Port Return Cable Set	For measurements where a 7 mm device-under-test is connected between the cable ends.
	HP 85135E 7 mm Flexible Test Port Return Cable	For measurements where one end of a 7 mm device-under-test is connected directly to a HP 85130E adapter on Port 1. The test port return cable is connected between the device-under-test and Port 2.
	HP 85135F 7 mm Flexible Test Port Return Cable Set	For measurements where a 7 mm device-under-test is connected between cable ends.
Adapters	HP 85130E Special 2.4 mm to 7 mm Adapter Set	Used to convert special 2.4 mm ports of the HP 8516A test set to 7 mm connector interface (m or f).
	HP 85130F Special 2.4 mm to 3.5 mm Adapter Set	Used to convert special 2.4 mm ports of the HP 8516A test set to 3.5 mm connector interface (m or f)
	HP 85130G Special 2.4 mm to 2.4 mm Adapter Set	Used to convert special 2.4 mm ports of the HP 8516A test set to standard 2.4 mm connector interface (m or f). Functions as “test port saver.”
	HP 11904S 2.4 mm to K-2.92® [1] Adapter Kit	This kit allows you to calibrate your HP 8516A test set using 2.4 mm devices and then change the test ports to K-2.92 and perform fully error corrected measurements. Contains (2) 2.4 mm to K(m) adapters and (2) 2.4 mm to K(f) adapters.

1 The K® factor is developed and manufactured by the Wiltron Company (Morgan Hill, CA).

NOTE

For more information on other 2.4 mm adapters, refer to the Operating Note "*2.4 mm Adapters and Calibration Accessories*" (HP part number 11900-90003).

Transistor Test Fixture Kit

The HP 85041A Transistor Test Fixture Kit (TTF) is a comprehensive measurement system for testing and characterizing stripline packaged microwave transistors.

Although it has 7 mm connectors and a frequency range limited to 18 GHz, the TTF may be adapted for use with the HP 8516A by using HP 85135C or HP 85135E cables and HP 85130E adapter set. Please consult with your local HP Sales Office for specific recommendations.

Operating and Safety Precautions

Electrostatic Discharge Information

Electrostatic discharge (ESD) can damage or destroy electronic components. All work on electronic assemblies should be performed at a static-safe work station. Figure 1-3 on page 1-11 shows an example of a static-safe work station using two types of ESD protection:

- Conductive table-mat and wrist-strap combination.
- Conductive floor-mat and heel-strap combination.

Both types, when used together, provide a significant level of ESD protection. Of the two, only the table-mat and wrist-strap combination provides adequate ESD protection when used alone.

To ensure user safety, the static-safe accessories must provide at least 1 MΩ of isolation from ground. Refer to Table 1-3 on page 1-12 for information on ordering static-safe accessories.

WARNING

These techniques for a static-safe work station should not be used when working on circuitry with a voltage potential greater than 500 volts.

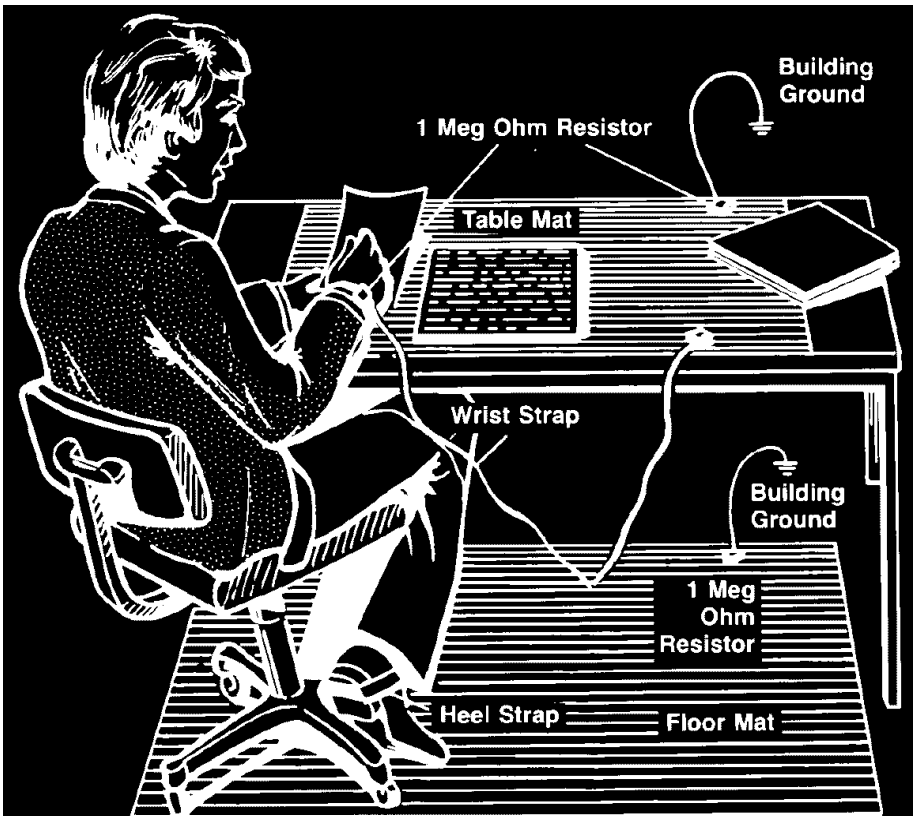


Figure 1-3 Example of a Static-safe Work Station

Reducing ESD Damage

The following suggestions may help reduce ESD damage that occurs during testing and servicing operations.

- Before connecting any coaxial cable to an instrument connector for the first time each day, momentarily ground the center and outer conductors of the cable.
- Personnel should be grounded with a resistor-isolated wrist-strap before touching the center pin of any connector and before removing any assembly from the unit.
- Be sure that all instruments are properly earth-grounded to prevent a buildup of static charge.

Table 1-3 lists static-safe accessories that can be obtained from Hewlett-Packard using the HP part numbers shown.

Table 1-3 Static-Safe Accessories

HP Part Number	Description
9300-0797	Set includes: 3M static control mat 0.6 m X 1.2 m (2 ft. X 4 ft.) and 4.6 cm (15 ft.) ground wire. (The wrist-strap and wrist-strap cord are not included. They must be ordered separately.)
9300-0980	Wrist-strap cord 1.5 m (5 ft.).
9300-1383	Wrist-strap, color black, stainless steel, without cord, has four adjustable links and a 7 mm post-type connection.
9300-1169	ESD heel-strap (reusable 6 to 12 months).

Operating Power Level

Do **not** exceed the front panel operating level power input as noted:

Table 1-4 Maximum Operating Power Level

Maximum Operating Power Level	Test Port
+17 dBm +13 dBm	Port 1 Port 2

- Do **not** exceed +15 dBm source RF input level into the test set and under no circumstances ever apply a DC level to the source RF input of the test set.
- Do **not** torque anything to the test port connector with greater than 90 N-cm (8 in.-lb.) of torque. The wrench supplied with your accessory kit is calibrated to 90 N-cm (8 in.-lb.).
- Do **not** torque anything to the source RF input on the back of your test set, with greater than 90 N-cm. (8 in.-lb.) of torque.

Service

The voltages in this test set warrant normal caution for operator safety. Nevertheless, service should be performed only by qualified personnel. Service strategy, troubleshooting procedures, replaceable parts and similar information for the HP 8516A test set is in this manual or the *HP 8510B/C Service Manual*.

Additional Equipment Required

Additional equipment and accessories required for use with the HP 8516A test set may be found in Table 4-4 on page 4-3. The table notes which items are required to verify the performance of the test sets and which are required to operate them. Other equipment may be substituted if its specifications meet or exceed the specifications listed in the critical specifications column.

Specifications

The specifications of the HP 8516A test set with an HP 8510B/C network analyzer are defined in the Specifications section of the *HP 8510B/C System Manual*.

Characteristics

The performance parameters for the HP in the 8510B/C/8516A are listed in the Specifications section, Table 4-1 on page 4-1. They are the typical or nominal characteristics of the HP 8510B/C/8516A.

2 Installation

This section explains how to install the HP 8516A test set. The topics covered include initial inspection, environmental considerations, positioning and connecting the test set for use, and packaging the instrument. Refer to the Installation section of the HP 8510 manual for more complete system connection and turn-on instructions.

Initial Inspection

Inspect the shipping container (including cushioning material) for damage. If it is damaged, keep it until you have checked the contents for completeness. The contents are listed and illustrated in Figure 2-1.

NOTE

If the shipping container is damaged, perform the performance tests outlined in the HP 8510 manual set. If the test set fails the performance tests, or is damaged or defective, keep the shipping materials and notify both the carrier and the nearest Hewleft-Packard office. The HP office will arrange for repair or replacement of the test set without waiting for settlement of the claim. If any of the following accessories are not received with the test set, notify your nearest HP office and the missing parts will be sent to you.

Environmental Considerations

Operation and Storage

To perform within specifications, the test sets should be operated in temperatures between 0°C and +55°C with relative humidity less than 95% (at 40°C dry bulb temperature, maximum). They may be operated at altitudes up to 4,500 meters (15,000 feet).

The test sets may be stored in temperatures from –40°C to +75°C, with relative humidity up to 90% at +65°(maximum dry bulb temperature) and at altitudes up to 15,240 meters (50,000 feet).

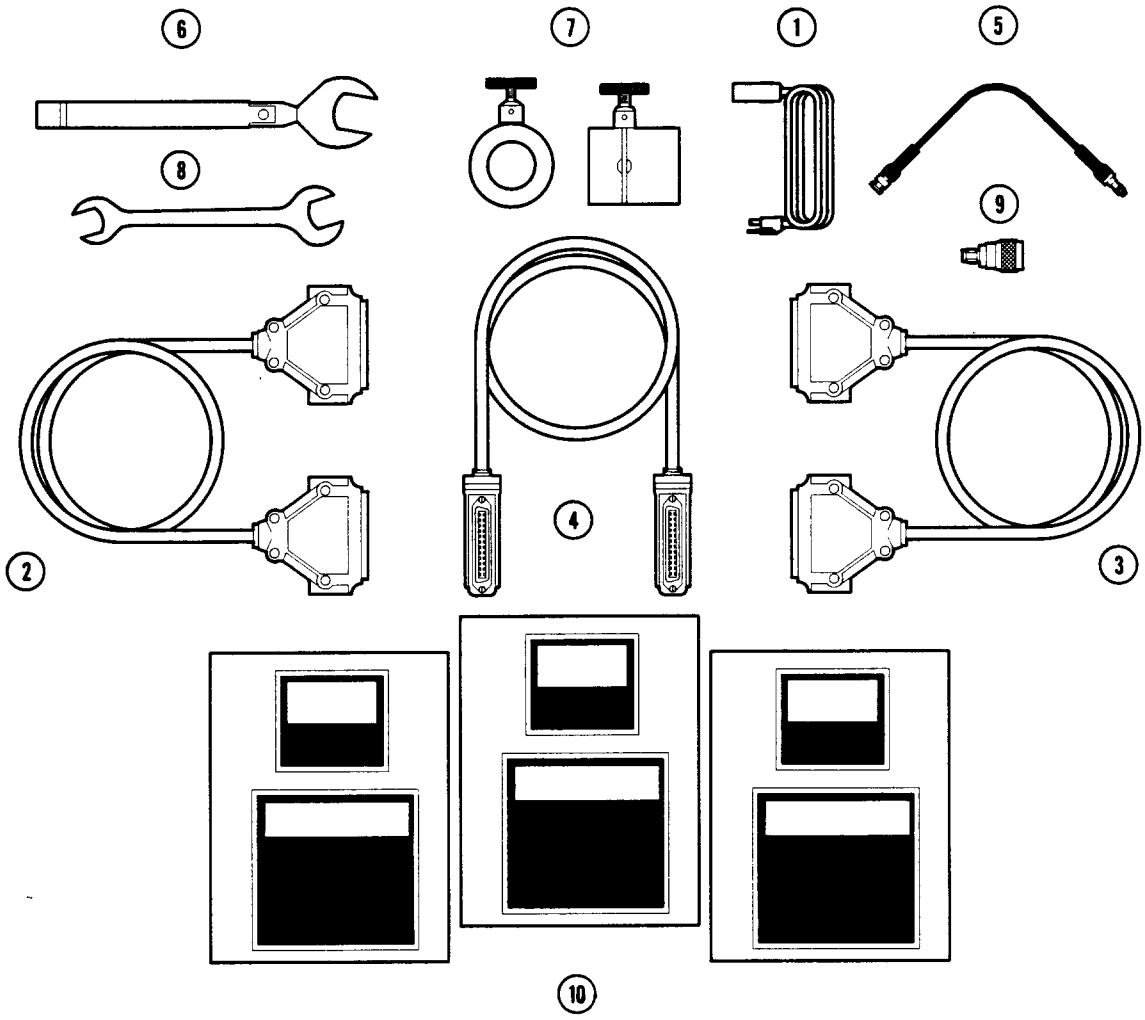


Figure 2-1 Accessories Supplied with the HP 8516A

Reference Designation	HP Part Number	Qty	Description
ACCESSORIES			
1	8120-1348	1	POWER CORD U.S.A. ONLY
2	08510-60102	1	TEST SET CABLE ASSEMBLY
3	08516-60009	1	CABLE ASSEMBLY, RS232
4	8120-3445	1	HP-IB CABLE ASSEMBLY
5	08513-60009	1	FLEX SOURCE CABLE
6	8710-1764	1	20 MM TORQUE WRENCH (8 IN.-LB.)
7	08515-60003	2	NON-ROTATING CLAMP
8	8710-1770	1	1/2 X 9/16 IN OPEN END WRENCH
9	1250-1894	1	ADAPTER MALE TYPE N TO SMA MALE

Reference Designation	HP Part Number	Qty	Description
SPECIFICATION AND PERFORMANCE VERIFICATION SOFTWARE REV. A.02.00			
10	08510-10031	2	PROGRAM DISK
	08510-10032	1	DATA DISK

Preparation For Use

Positioning the Test Set

Typically the test set is placed on a work surface, whether it is rack-mounted or used on a bench. To install the flanges to rack mount the instrument (with or without handles) in a standard 19 inch rack, refer to Figure 2-2.

The recommended rack is the HP 85043A. Instructions for rack mounting the test set in a system configuration with the HP 8510 are provided in the HP 8510 Installation section and in the HP 85043A system rack manual

CAUTION

When installing the test set for use on a bench, place it on a grounded anti-static work surface (refer to Figure 1-2 on page 1-8) to lessen the chance of ESD damage. The anti-static surface should extend far enough in front of the test set to provide effective protection for the test ports and cable ends.

A grounding receptacle is provided on the test set as an alternate grounding point for your wrist strap.

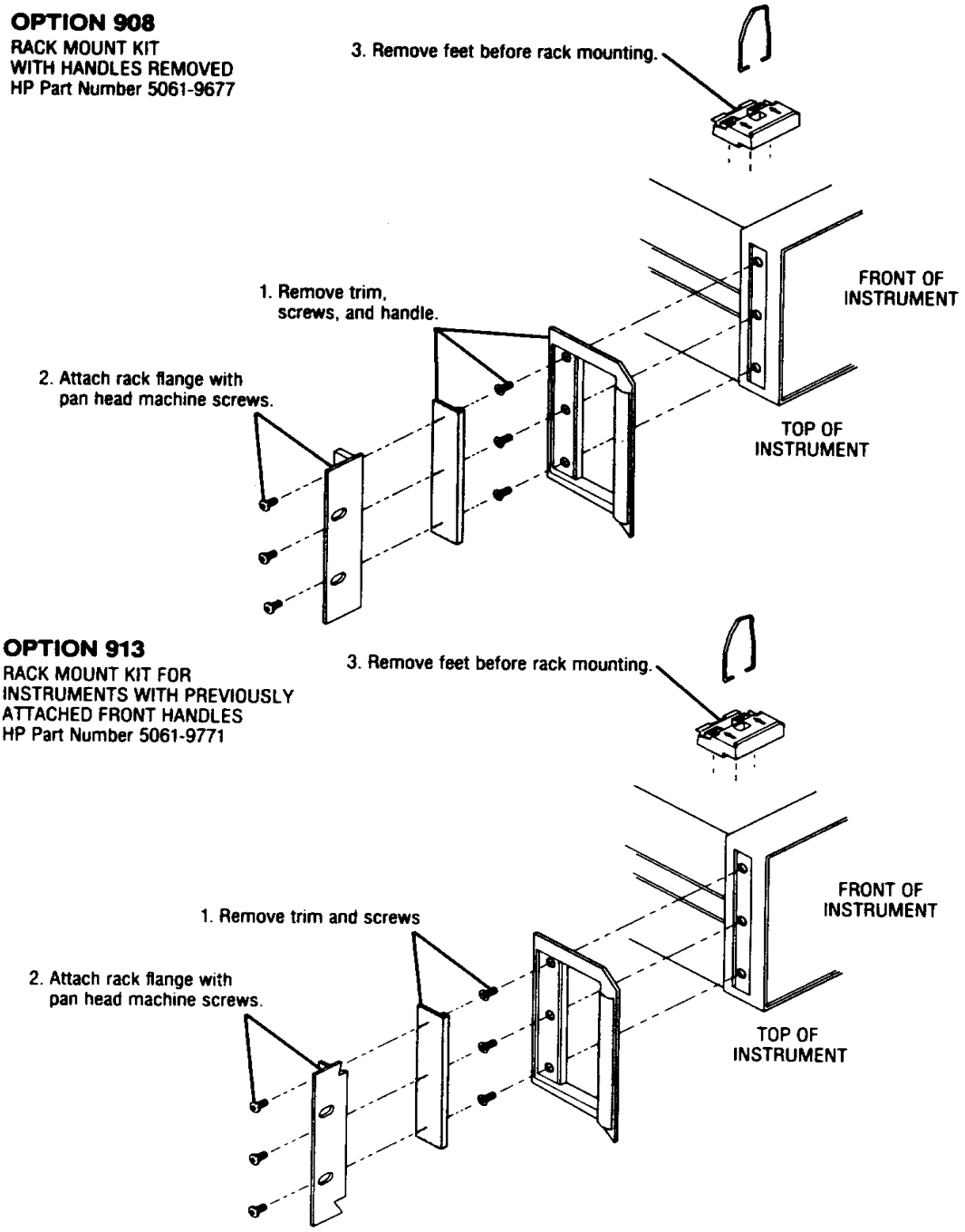


Figure 2-2 Attaching Rack Mounting Hardware

Connecting the Test Set

Mating Connectors

HP 8516A Ports 1 and 2 are precision 2.4 mm connectors and mate with precision 2.4 mm female connectors.

The TEST SET INTERCONNECT connector is a series-D subminiature female connector with seven RF connections. It mates with the corresponding male connector.

The 8510 SYSTEM BUS connector is a female HP-IB type connector and mates with the corresponding male connectors of HP-IB cables.

Power and Control Connections

Figure 2-3 shows the following connections (with the exception of line power) and the required RF source connections.

Connect the power cord to an electrical outlet and the line module to supply power to the test set.

Connect the test set IF interconnect cable from the J11 TEST SET INTERCONNECT connector on the rear panel of the test set to the J1 TEST SET INTERCONNECT connector on the rear panel of the HP 85102 IF Detector.

Connect the system bus cable from the HP 8516A J12 HP 8510 SYSTEM BUS connector to the HP 8510 INTERCONNECT connector of the HP 85101 display/processor. The test set IF interconnect cable and the system bus cable transmit control signals between the test set and the network analyzer.

Connect the source control cable from the HP 834XX source to the J15 TEST SET INTERCONNECT connector on the rear panel of the HP 8516A test set.

NOTE

The HP 8516A test set requires a HP 834XX source with firmware revision date 11 MAY 88 or later to operate. You may **not** use a HP 8350B sweep oscillator or any other source. The HP 8510 must have firmware revision 4.0 or higher. Refer to “Instrument Compatibility” on page 1-3 for more information.

Signal Path Connections

The IF signals from the test set are transmitted to the HP 85102 IF detector by the test set IF interconnect cable (see above).

RF signals are transmitted from the source to the test set by the 3.5 mm flexible RF cable supplied with the test set.

Anti-Rotation Clamps

Use these clamps to stabilize the test port/RF cable connection. Connect the test port cables to the test ports and tighten them as specified in the cable manual. Loosen the anti-rotation clamp thumbscrew sufficiently to slip the clamp over the cable and up to the front panel. The clamp end with the flats

should come to rest on the flats of the test port shoulder. Finger tighten the thumbscrews to prevent further loosening or tightening of the test port/RF cable connection.

The internal O-ring (HP Part Number 0900-0007) is field replaceable without disassembling the anti-rotation clamp. Pry it out with fine tweezers or a similar tool when it no longer holds the RF cable securely. Insert the new O-ring by engaging one side of it in the slot of the phenolic clamp donut. Use your fingers to push the O-ring into the rest of the slot.

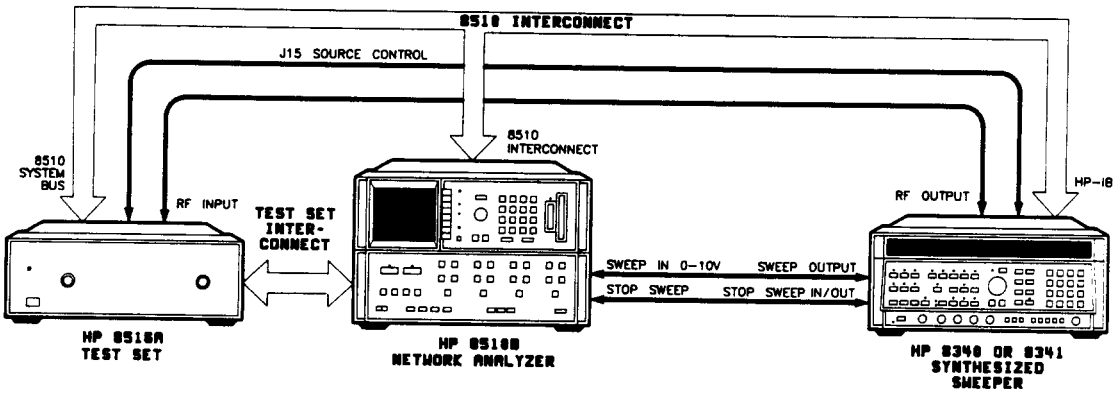


Figure 2-3 HP 8516A System Connections

Packaging

If reshipping is required, each test set should be repackaged in the original factory package. Containers and materials identical to those used by the factory are available through Hewlett-Packard offices.

Alternatively, comparable packaging materials may be used. Wrap the test set in heavy paper or anti-static plastic. If shipping to an HP Office or Service Center, complete and attach a service tag (in the HP 8510 manual set). Use sufficient shock absorbing material on all sides of the test set to provide a thick, firm cushion and prevent movement. Seal the shipping container securely and mark it FRAGILE.

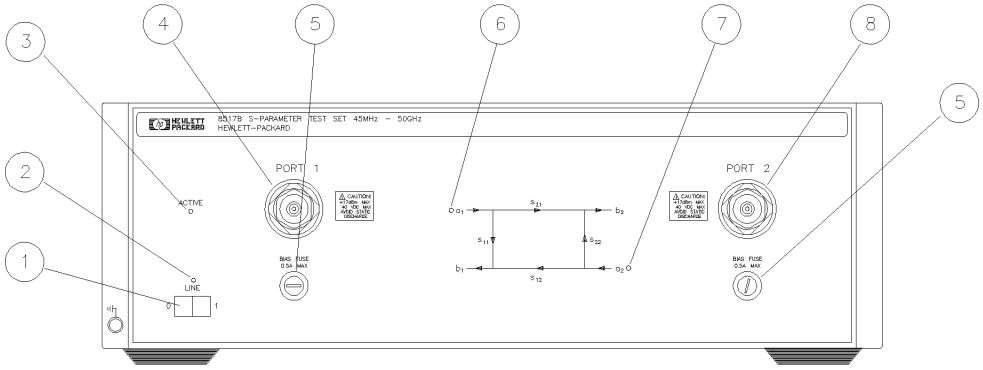
In any correspondence with HP, refer to the test set by full model and serial number.

3 Operation

This section illustrates the features and functions of the front and rear panels of the HP 8516A test set. It also describes Option 001, Multiple Test Set Operation, available with these Hewlett-Packard test sets: HP 8511A, HP 8514B, HP 8515A, and HP 8516A. It also includes the related automatic control by the HP 8510B/C Network Analyzer.

Front Panel Features

Table 3-1 HP 8516A Front Panel Features



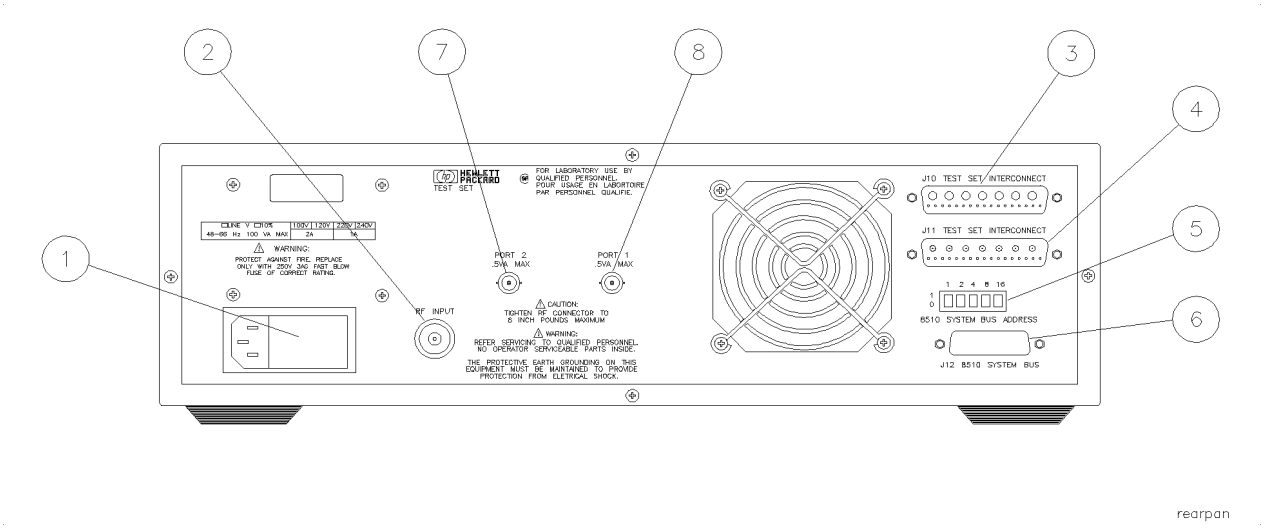
Item Number	Description or Label	Function Description
1	Line Switch	This switch turns the test set on and off. When the side of the switch labeled **O** is depressed, the test set is off; **|** is on.
2	Line LED	This LED goes on and off with the test set line switch.
3	Active LED	This LED lights about two seconds after power is turned on, following the successful conclusion of self-test. If the test set is used with other test sets (Option 001) and is not addressed by the HP 8510, then this light remains off.
4	Port 1	This test port transmits RF energy from the source to the DUT and receives reflected or transmitted RF energy from the DUT. The reflected RF energy is coupled to a sampler within the instrument. Under no circumstances should anything be torqued to the test port connector with greater than 20 inch-pounds
5	Bias Fuse	The fuse which limits bias applied to Port 1 is within this holder (see the instrument front panel or the replaceable parts list for the value of the fuse).

Table 3-1 HP 8516A Front Panel Features

6	a1 LED	This LED indicates that the HP 8516A is internally switched to the S_{11} or S_{21} mode and source power is switched to Port 1.
7	a2 LED	This LED indicates that the HP 8516A is internally switched to the S_{22} or S_{12} mode and source power is switched to Port 2 .
8	Bias Fuse	The fuse which limits bias applied to Port 2 is within this holder (see the instrument front panel or the replaceable parts list for the value of the fuse).
9	Port 2	In the HP 8516A, this test port transmits RF energy from the source to the DUT and receives reflected or transmifted RF energy from the DUT. In the HP 8516A Option 003, high forward dynamic range configuration, the Port 2 coupler is reversed to optimize dynamic range in the forward direction. The received RF Port 1 energy is input directly to a sampler within the instrument.

Rear Panel Features

Table 3-2 HP 8516A Rear Panel Features



Item	Label or Description	Function Description
1	Line Module	This assembly houses the line cord connector, line fuse and line voltage selector. Pull out the right side of the line module cover to replace or change the fuse or to change the voltage selection. Note that the voltage selector drum must be removed to rotate it to a different voltage setting. Recommended fuse values are printed on the rear panel.

Table 3-2 HP 8516A Rear Panel Features

2	RF Input	This 3.5 mm connector receives RF energy from the source. Connections made to this input must be torqued no more than 10 in.-lb.
3	J10 Test Set Interconnect	This connector is used only in test sets with Option 001. It allows connecting another test set to the Option 001 test set. Up to four test sets can be serially connected to the HP 8510. The HP 8510B/C system automatically selects the IF output from the chosen test set for processing and display. Refer to “Controlling Multiple Test Sets”, in this section, for more information.
4	J11 Test Set Interconnect	This connector transmits the IF signal from the test set to the HP 85102 IF Detector. It also transmits control signals bidirectionally.
5	HP 8510 System Bus Address Option Switch	This five-pole binary-weighted switch sets the system bus address of the test set. The binary weight of each pole is indicated on the rear panel as are the on and off positions. Decimal twenty (off-off-on-off-on, from left to right) is the default setting.
6	J12 8510 System Bus Connector	This connector is used for HP-IB communications with the HP 85101 display/processor.
7	Port 2 Bias	This female BNC connector is used to supply bias through the center conductor of Port 2 to active devices under test.
8	Port 1 Bias	This female BNC connector is used to supply bias through the center conductor of Port 1 Port 2 to active devices under test.
9	J15 Source Control	This RS-232 connector is used by the HP 834XX source to control the HP 8516A test set Switch Doubler

Controlling Multiple Test Sets

HP 851X Series, Option 001 test sets allow an HP 8510B/C to alternately control up to four test sets connected to it. For example:

- While a measurement is underway on test set number 1 (equipped with Option 001), a test device can be connected to test set number 2 (which does not need Option 001).
- When the measurement on test set number 1 has completed, the network analyzer can then control test set number 2.

In a standard test set, the 20 MHz IF and control signals are applied directly to J11 TEST SET INTERCONNECT, which is attached to the HP 8510B/C.

Option 001 adds a set of IF switches, control switches, and the J10 TEST SET INTERCONNECT attachment. This configuration allows the selection of the 20 MHz test set IF signals.

As shown in Figure 3-3 on page 3-4, test set number 1 can:

- apply its IF signal to the HP 8510B/C, or it can
- switch to pass the IF signal from test set number 2, through J10 TEST SET INTERCONNECT, and into the network analyzer.

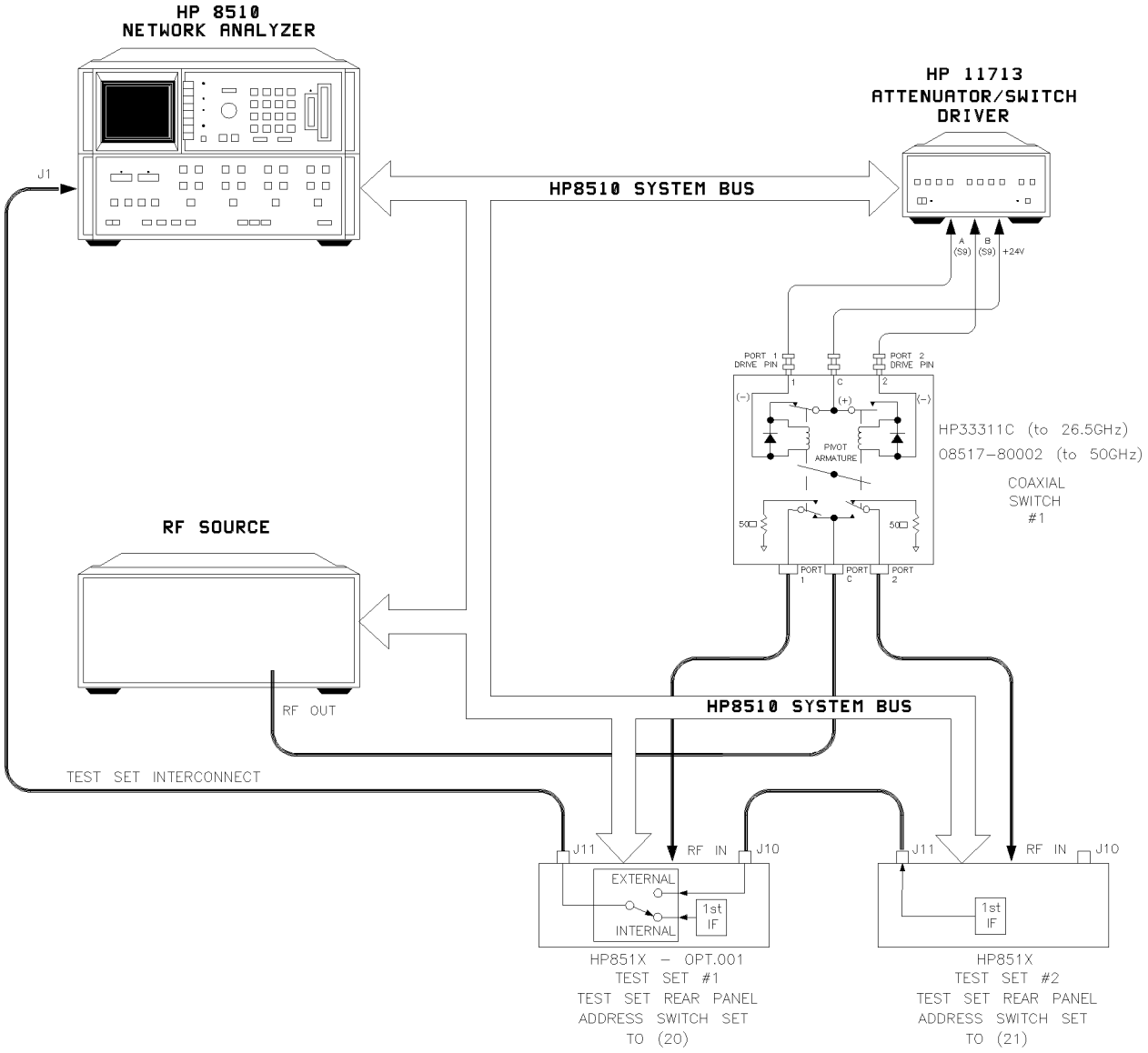


Figure 3-1 RF and IF Switching with Two Test Sets

HP 33311C Coaxial Switch Positions with Two Test Sets		
NEW Address of Test Set[1,2]	**Test Set Selected**	**HP 33311C Coaxial Switch Port Selected**
20	1	Port 1
21	2	Port 2

1 Not all system connections are illustrated.

2 In dual source configurations, the second source may be multiplexed in a similar manner. If only one dual source test set is used, the second source may be connected directly to the appropriate test set.

Multiple Test-Set Connections

For dual test-set configurations, set each rear panel address switch on the test sets to the address shown in Figure 3-3. Refer to Figure 3-4 on page 3-7 for configuration of two or more test sets.

- Use the supplied test set interconnect cable to attach test set number 1, J11 to the network analyzer.
- Use the supplied test set interconnect cable to attach test set number 2, J11 to test set number 1, J10.

You may continue connecting up to four test sets in series this way, if the total length of all test set interconnect cables does not exceed 13 meters (about 40 feet). The last test set connected in the chain does not require Option 001.

If an RF coaxial switch is not incorporated into the system, the RF input to the test set must be manually switched to the active test set.

Initialization at Power-Up

At power-up, configure the IF switches so that only *one* system test set is active. The following procedure shows how to make one test set active:

1. Check the LEDs of all system test sets. They should all be lit.
2. Check the network analyzer's test set address by pressing the front panel button, **LOCAL**, then **TEST SET**. The address displayed needs to match the address of the test set selected. If not, correct the address setting on the network analyzer. The instructions are in Table 3-4 on page 3-6.
3. If unselected test set LEDs are on, deactivate the unwanted test set by addressing it, then enter the address of the desired test set. Refer to the procedure in Test Set Addressing for instructions.

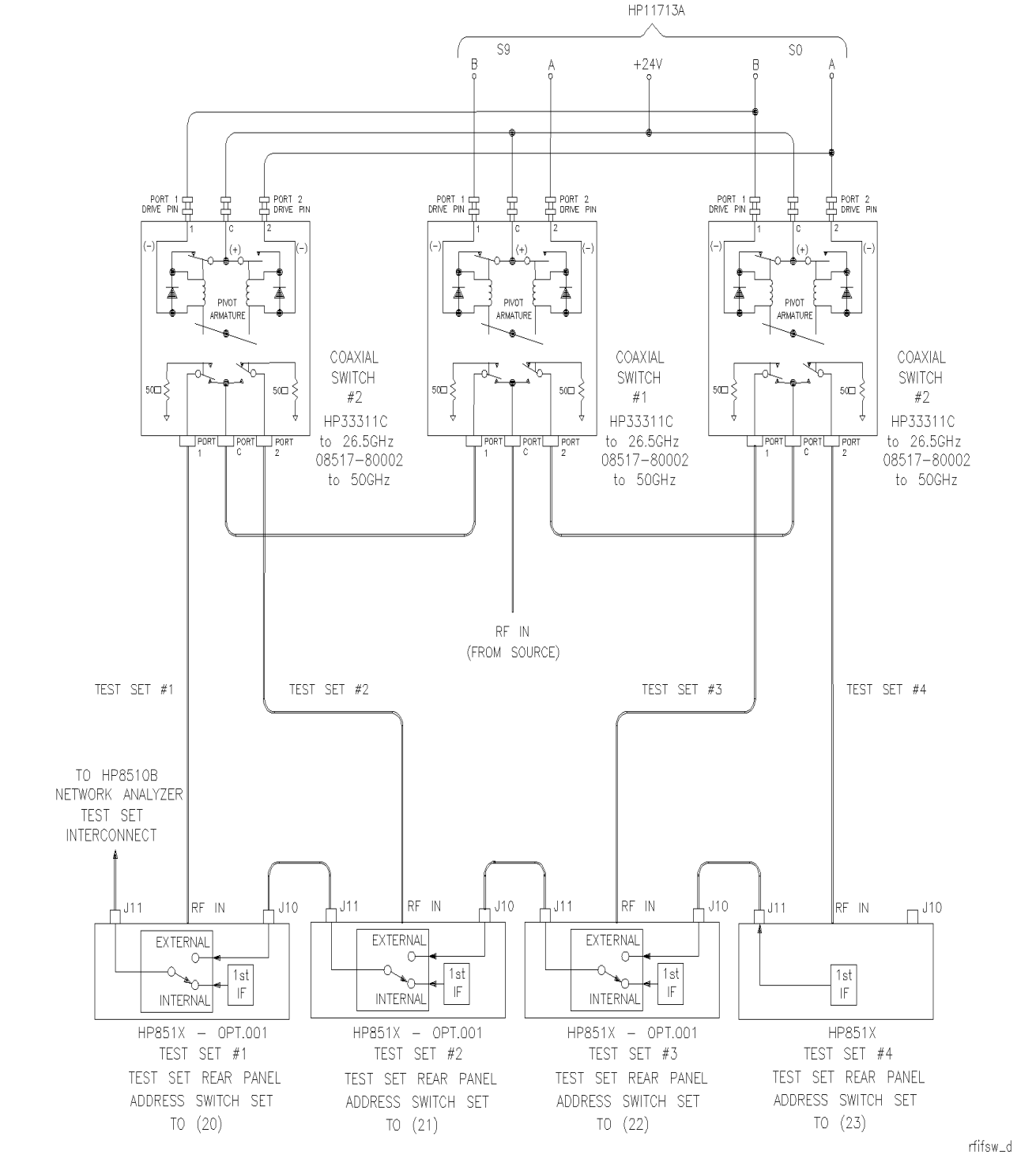
Selecting a Test Set

To select a test set, follow the procedure in Table 3-3 on page 3-7.

Table 3-3 Selecting a Test Set When Multiple Units are Configured

et IF Switching	The active test set is selected by the built-in capability of the analyzer to generate an addressed command to the test set. Each time the **HP 8510 ADDRESS of TEST SET** function is changed (refer to LOCAL Menu in the HP 8510B/C manual), the network analyzer: • switches the IF signal of the previously addressed test set to external • switches the IF signal of the newly addressed test set to internal • sets the front panel ACTIVE LED to indicate test-set status • applies the active test set IF signals directly to J11 TEST SET INTERCONNECT • passes the inactive test set's IF signals at J10 through to J11 and on to the next test set or to the network analyzer	Test Set IF Switching
et Addressing	To change the address of the active test set, change the address displayed on the HP 8510B/C and set the mechanical switch on the rear panel of the test set. Here's how: 1 On the analyzer's front panel, select the **HP 8510 ADDRESS OF TEST SET** function. 2 Using the key pad, enter the desired address for the test set, then press **X1** . The HP 8510B/C now displays the new address. **OR to change the network analyzer read-out, you can:** • use the network analyzer's HP-IB ADDRESS; command and enter the desired address Now, to actually change the test set's addres, re-set the switches located on the test set's rear panel to match the number displayed on the network analyzer screen.	Test Set Addressing
itch Driver Control	Another feature of the network analyzer is that a code sequence is automatically issued across the HP 8510B/C system bus to the device at the ADDRESS of RF SWITCH when the **HP 8510 ADDRESS of TEST SET** function is changed. In the recommended configuration, the device is an HP 11713A Attenuator/Switch Driver. The switch/driver in turn controls one or more coaxial switches. These switches, (shown in a Figure 3-3 on page 3-4, and Figure 3-4 on page 3-7) are used to choose which test set receives the RF output from the network analyzer source. The exact command issued depends upon the new value of the **ADDRESS of TEST SET** function, also shown in shown in a Figure 3-3 and Figure 3-4.	RF Switch Driver Control

Figure 3-2 RF and IF Switching with Four Test Sets


HP11713A
S9
S0
B
A
+24V
B
A
PORT 1 DRIVE PIN
PORT 2 DRIVE PIN
PIVOT ARMATURE
50Ω
PORT 1
PORT C
PORT 2
COAXIAL SWITCH #2
HP33311C
to 26.5GHz
08517-80002
to 50GHz
COAXIAL SWITCH #1
HP33311C
to 26.5GHz
08517-80002
to 50GHz
COAXIAL SWITCH #2
HP33311C
to 26.5GHz
08517-80002
to 50GHz
RF IN
(FROM SOURCE)
TEST SET #1
TEST SET #2
TEST SET #3
TEST SET #4
TO HP8510B
NETWORK ANALYZER
TEST SET
INTERCONNECT
J11
RF IN
J10
EXTERNAL
INTERNAL
1st IF
HP851X – OPT.001
TEST SET #1
TEST SET REAR PANEL
ADDRESS SWITCH SET
TO (20)
HP851X – OPT.001
TEST SET #2
TEST SET REAR PANEL
ADDRESS SWITCH SET
TO (21)
HP851X – OPT.001
TEST SET #3
TEST SET REAR PANEL
ADDRESS SWITCH SET
TO (22)
HP851X
TEST SET #4
TEST SET REAR PANEL
ADDRESS SWITCH SET
TO (23)
rfifsw_d

HP 33311C Coaxial Switch Positions with Four Test Sets			
New ADDRESS of Test Set[1,2,3]	**Test Set Selected**	**HP 33311C Coaxial Switch Port Selected**	
		Switch #1	**Switch #2**
20	1	Port 1	Port 1
21	2	Port 1	Port 2
22	3	Port 2	Port 1
23	4	Port 2	Port 2

1. Not all system connections are shown.
2. In dual source configurations, the second source can be multiplexed in a similar manner.
3. If only one dual source test set is used, the second source can be directly connected to the appropriate test set.

Measurement Calibration

After selecting the active test set, complete the system calibration procedure as usual. When you select a different test set, make sure that you recall the cal set that applies to that test set.

NOTE

Since the cal-set limited instrument state does not include the number of the active test set, a cal set which does not apply to the current test set can be turned on without displaying the HP 8510B/C caution messages. However, this causes errors in the data displayed because incorrect error coefficients are applied to the measured data.

For convenience, store a hardware-state file and an instrument-state file for each combination of test set to cal set. You may also store your hardware state file on a tape or disk for future use.

To change the configuration, recall the appropriate hardware state file. The hardware state file does the following:

- sets the address of test set
- issues the RF switch command, then
- recalls the appropriate instrument state file which
- recalls the cal set

Making Operational Checks

To check the operation of multiple test set configurations, do the following:

1. Connect a device with a known response to test set number 1. Press:

   HP 8510 LOCAL, TEST SET

   ADDRESS of TEST SET

2. Enter the address of test set number 1 (which is 20).
3. Press **x1**. The measurement from test-set number 1 should appear.
4. Press the following keys to store the trace for comparison later:

   DISPLAY

   DATA --> MEMORY

   DISPLAY: DATA and MEMORY

5. Now use ***ADDRESS of TEST SET*** to select test set number 2, then switch back to test set number 1.
6. Observe any difference in the response between the stored trace and the results after switching back and forth between the test sets.
7. Repeat the procedure for each of the other test sets.

Any differences in data that you suspect are due to the IF switch (Option 001) or to RF switching, must be investigated.

Performance Verification

Standard system performance verification procedures verify the operation of an Option 001 test set used as test set number 1.

To verify the performance of a different test set in the configuration, use **ADDRESS of TEST SET** to select it, then continue with this procedure.

Refer to the HP 8510B/C On-Site Service Manual for its performance verification procedure.

Using the Anti-Rotation Clamps

Use anti-rotation clamps to secure RF connections at the test ports of the test sets. When installed, each clamp holds the large nut on the test set's RF test port to the connector on an RF cable attached to the port. If an adapter is used, the clamp stabilizes the adapter to the front panel RF port connector.

Without these clamps, the test port connections can loosen when the device under test is moved. This, in turn, can invalidate calibrations and measurements.

NOTE These instructions refer to an installation using HP RF cables. However, the anti-rotation clamps may also be used with front panel adapters. Adapter installations are similar. There are two anti-rotation clamps included in the test set accessories box.

Attach the first clamp

Remove one anti-rotation clamp from the accessories box. Loosen its thumb-screw until it is nearly removed from counter-sink socket in the clamp body. The clamp is shown as item (5) in Figure 2-1, "Accessories Supplied with the HP 8517B Test Set."

1. Gently push the clamp (round-hole end first) over and past the RF cable connector to be used.
2. Fit the rubber O-ring in the round end of the clamp over the connector.

NOTE If the O-ring is not snug or is damaged, refer to the Chapter 6, procedure (8) "Replacement Procedures" for instructions about replacing the internal O-ring.

3. Wiggle the clamp to ease it over the connector.
4. Attach the cable to the test port and tighten it as specified in the cable manual.

NOTE Do not twist the cable as you attach it to the test port.

Use the torque wrench supplied with your calibration kit to tighten the cable to 90 N-cm (8 in-lb), and *no greater.*

WARNING

Important! The test set RF connector becomes loosened easily. Hold the RF cable securely throughout the remainder of this procedure. Do not allow the cable to rotate.

Positioning the thumb-screw

See Figure 3-5. Position the clamp so the thumb-screw is positioned at the top of the clamp.

- Turn the clamp to visually align the clamp flats with the flats on the test port connector nut.
- This positioning minimizes rotating the connector in the procedure step.

The flats may actually be in any orientation, with respect to the front panel.

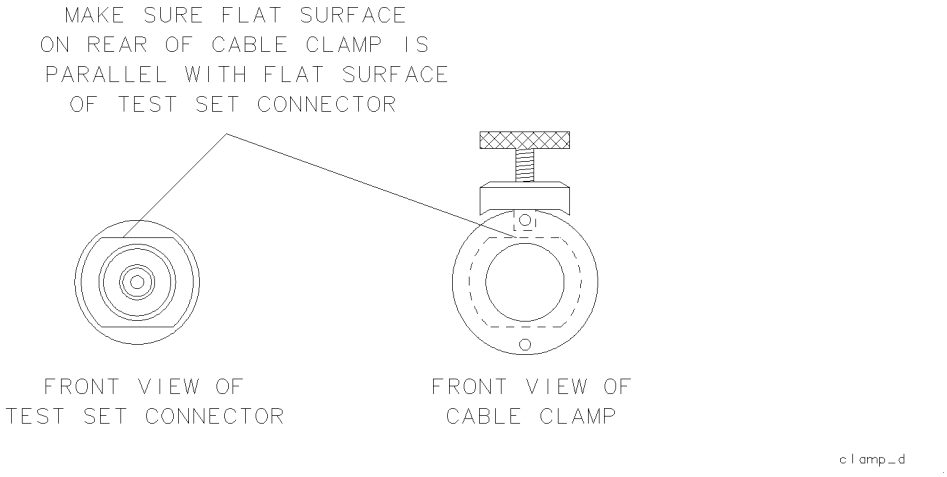


Figure 3-3 Visually Aligning Clamp and Nut Flats

Positioning the connector

See Figure 3-6. Maneuver the clamp over the RF connector and onto the test port connector.

1. Hold the test cable with one hand. Use the other hand to press the clamp gently and steadily, as you wiggle it into position straight over the RF connector and onto the test port connector nut.

NOTE

Be sure to loosen the clamp when you are slipping it over the connector.

2. Fit the internal flats in the clamp over the flats on the test port connector nut.

Avoid rotating the clamp as you position it so the RF connection remains tight (remember it loosens easily).

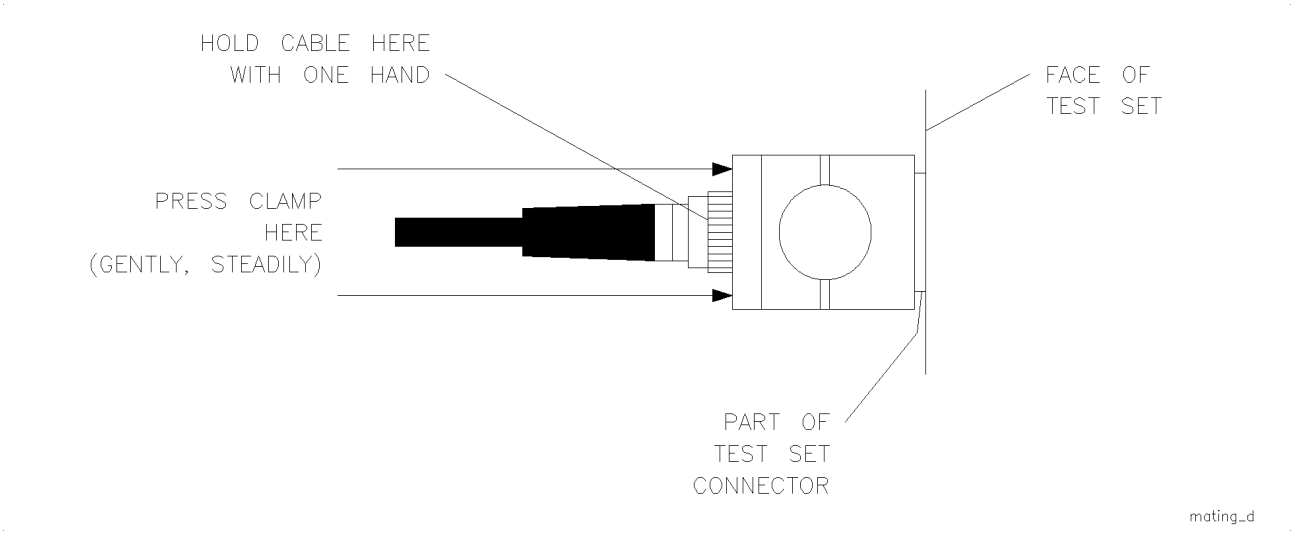


Figure 3-4 Mating the Clamp and Nut Flats

Aligning the thumb-screw

See Figure 3-5. Ensure that the thumb-screw is aligned with the counter-sink hole on the clamp's body.

1. Push the clamp toward the test set front panel.
2. Finger-tighten the thumb-screw. The cable cannot be damaged if the thumb-screw is tightened too tightly.

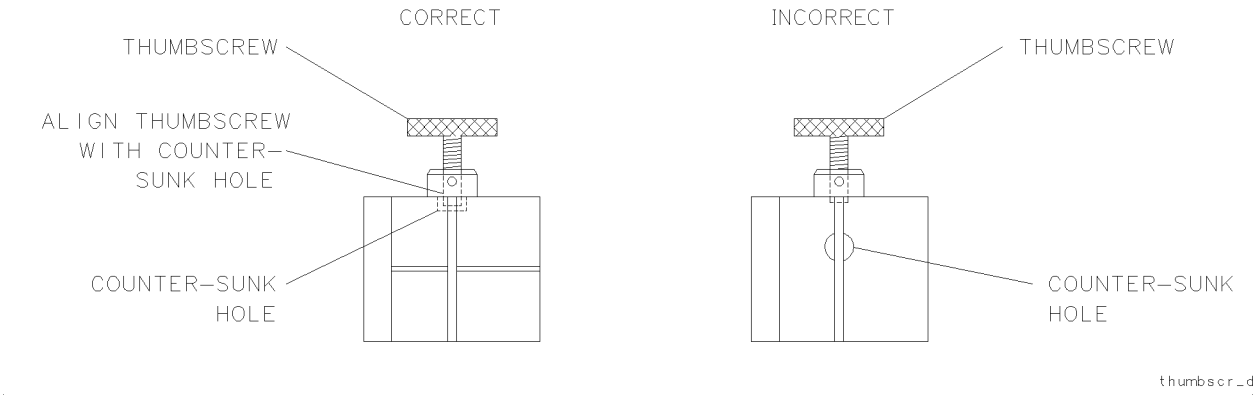


Figure 3-5 Aligning the Thumbscrew With the Counter-Sink Hole

Attaching the second clamp

To complete the anti-rotation clamp installation, repeat the steps above, beginning at step 1 to attach the second clamp.

3. Make sure the thumbscrew is aligned with the counter-sunk hole in the clamp body. Push the clamp toward the test set front panel and then tighten the thumbscrew with your fingers. The cable cannot be damaged by tightening the thumbscrew too tightly. Refer to Figure 3-6.

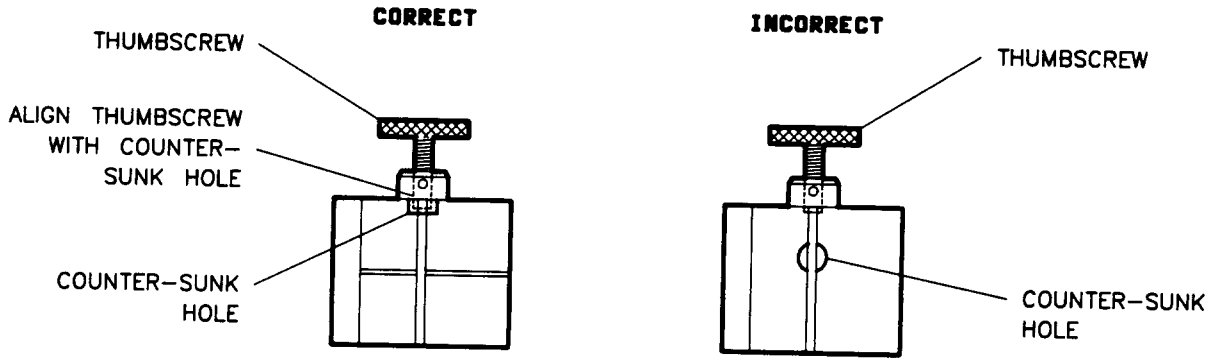


Figure 3-6 Aligning the Thumbscrew With the Counter-bored Hole

4. Repeat steps 1 through 6 for the other clamp.

This completes the anti-rotation clamp installation procedure. Refer to the installation section of the test set operating and service manual for instructions to replace the internal O-ring in the anti-rotation clamp.

4 Specifications

Specifications describe the warranted performance of the instrument. The electrical specifications of the test set, used with an HP 8510 network analyzer, are defined in the *HP 8510B/C On-Site Service Manual*.

Mechanical Specifications

Table 4-1 Mechanical Specifications

Test Ports Description	Specification
NMD-2.4 mm connector center pin recession[1]:	+0.00256 mm to +0.0127 mm
	(+0.0001 in. to +0.0005 in.)

Refer to the calibration kit manual for instructions about measuring pin depth with the gage.

Supplemental Characteristics

Supplemental characteristics listed in Table 4-2 provide useful information, by giving typical, but non-warranted, performance parameters.

Table 4-2 HP 8516A Characteristics

Test Ports (Front Panel)	RF Connectors (Rear Panel)
Connector type: precision 2.4 mm male **Connector torque:** 8 in.-lb., maximum **Impedance:** 50 ohms nominal **DC bias:** 500 mA, 40 Vdc, maximum **Damage input level:** Port 1: 17 dBm CW RF Port 2: 13 dBm CW RF **Nominal operating power level:**[1] Operating Level: Port 1 Port 2 Standard –10 dBm ±5 dBm –10 dBm ±5 dBm Option 003 –10 dBm ±5 dBm –25 dBm ±5 dBm **Nominal connector nut size:** 20 mm **Recommended torque:** 90 N-cm (8 in.-lb.)	**Connector type:** precision 3.5 mm female **Connector torque:** 8 in.-lbs., maximum **Damage input level:** 15 dBm[2] **User 1 power levels for reference channel phase lock:** Minimum: –45 dBm Maximum: –10 dBm **Nominal connector nut size:** 8 mm **Recommended torque:** Precision 3.5 mm: 90 N-cm (8 in.-lb.) SMA: 56 N-cm (5 in.-lb.)

1. Available power in PRESET condition.
2. Must be AC coupled.

Table 4-3 HP 8516A Power Requirements and Physical Characteristics

Operating Temperature:	0°C to 55°C
Power:	110, 120, 220 or 240 ±10% Vac; 47 to 66 Hz line frequency
Dimensions:	460 mm X 133 mm X 609 mm (18.1 X 5.25 X 24 inches)
Weight:	HP 8516A: 15 kg (35 lb) net

Table 4-4 Recommended Equipment

Item	Critical Specifications	Recommended Model	Use[1]
Network analyzer	No substitute	HP 8510B/C	O,P,T
Source[2]		HP 8340B, HP 8341B, or HP 8360	O,P,T
			P
Controller	No substitute	HP 9000 series 200 or 300 with 4 Mbyte RAM and BASIC 3.0 or higher	
		OR	
		PC-305 or PC-308 HP BASIC Controller with 4 Mbytes of Basic Language Processor RAM	P
			T
Disc drive	compatible with controller	HP 3456A	T
Multimeter	range: 0 to 50V	HP 1740A	
Oscilloscope	50 MHz bandwidth		

1. O = operation; P = performance test; T = troubleshooting

2. Revision May 11, 1988 firmware or higher required.

3. PC or laptom running HP Basic for Windows Revision 3.0 or grater under Windows (3.1/95/NT) HP-IB card for PCs (National Instruments/HP) PCMCIA card for Omnibook/Laptops (NI).

5 Test Set Troubleshooting

The information in this section is presented as an aid in troubleshooting the HP 8516A test set. If you are not certain that the problem with your system is due to a faulty test set, read the sections titled Service Overview and Built-In Diagnostics in this manual. Continue reading this section only if you know the test set is faulty.

The information consists of procedures for checking:

- The test set temperature
- Check all connections
- Power supply/regulator, fuses, switches
- Test set self-test indicators
- Check VTO/Driver (LO)
- Nominal programmed source pPower
- Test set disassembly
- Unratioed power test

Test Set Temperature

The processor on the A4 HP-IB board monitors the test set temperature with a comparator on the A3 VTO summing amplifier. The temperature sensor is located on the A14 VTO/driver assembly. If the temperature of the VTO/driver exceeds 85 degrees celsius, the HP 85101 displays the **TEST SET TOO HOT** prompt.

CAUTION

TEST SET TOO HOT means turn off the test set now. This message is only a prompt. It does not turn off the test set.

Determine the reason for the prompt before subjecting the test set to continuous use.

Check All Connections

Check connections for loose, broken, crimped, etc. connections on the:

- Test set rear panel
- A3 Summing Amp
- A5 Att/SW Driver board cables
- Sampler cables
- RF path connections from rear panel to front panel. Power holes often result from faulty connections. All semi-rigid coax cables should be torqued to 10 in. lb.

Check Power Supply/Regulator, Fuses, Switches

On the A15 Regulator Board Assembly, use a digital voltmeter to check the voltages of Table 5-1. Use an oscilloscope to check ripple (if necessary).

Power Supply

Table 5-1 Test Set Power Supply Criteria

Nominal Voltage	Test Point	Voltage Range	Maximum Ripple Peak to Peak
+14.85	A22TP1	+14.10 to +15.60	2 mV
–14.85	A22TP2	–14.10 to –15.60	2 mV
+5.05	A22TP3	+4.75 to +5.25	2 mV
–5.20	A22TP6	–4.90 to –5.50	2 mV

Fuses

The HP 8516A uses seven fuses. SeeTable 6-4, and Table 6-5 for the part numbers of these fuses.

- Two fuses are accessible from the front panel and are used to fuse the bias supply.
- Four fuses are used on the regulator board.
- One fuse is used in the line module on the rear panel.

HP-IB Address Switches

Set the switches as indicated (dark side of switch is depressed). The HP-IB address switch is on the test set rear panel. It is easy to access but need not be changed unless the HP 8510 bus error message **SYSTEM BUS ADDRESS ERROR** is visible on the CRT. It is shown in Figure 5-1.

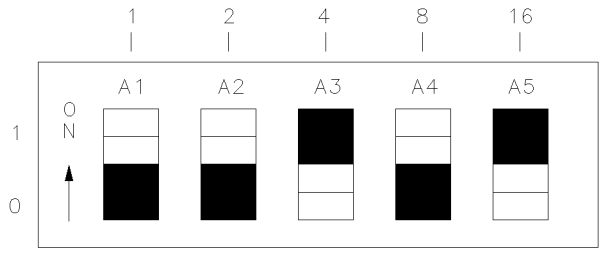


Figure 5-1 HP-IB Switch Setting for All Test Sets (20, Binary)

Test Set Self-Test Indicators

If the **ACTIVE** LED, on the front panel of test set selected by the HP 8510, does not light within two seconds of turn on or lights immediately, the test set has not passed its self-test. You can determine what part of the self-test failed by noting which HP-IB LEDs on the A4 board are lit, as shown below:

Self-Test Indication	A4 HP-IB LEDs				Time (after turn-on)
	LSN	TLK	SRQ	REM	
PWON	ON	ON	ON	ON	0 to 0.5 seconds on
Fail ROM Test	OFF	ON	ON	ON	briefly
Pass ROM Test	OFF	OFF	ON	ON	
Pass RAM Test	OFF	OFF	OFF	ON	0.5 to 2.0 seconds
Pass RAM Test	OFF	OFF	OFF	OFF	after 2 seconds

Two seconds after turn-on, all four HP-IB LEDs on the top of the A4 board should turn off at the same time the front panel **ACTIVE** LED lights. Then the LEDs will light according to the state of the test set. If you are using Multiple Test Sets, the first test set in line becomes the active test set until another is chosen.

If Self-Test Fails to Run

If the portion of memory which contains the self-test programming is faulty, the self-test will not run properly. The following conditions indicate that the self-test ROMs are faulty:

- All LEDs flash briefly and go off
- All LEDs flash briefly and stay on
- ACTIVE LED goes on too soon
- ACTIVE LED does not go on

Be aware that there are other problems that can cause the self-test to fail, it is just that the ROMs are the most probable cause.

Check VTO/Driver (LO)

There are two procedures available for checking the VTO.

- check the VTO at two frequencies,
- and the more thorough of the two, check the VTO at 12 frequencies across the VTO range

Check the VTO at two frequencies

Using a frequency counter and a voltmeter, check the VTO fundamental frequency and A3 Summing Amp output as follows:

1. Disconnect the Test Set-IF Interconnect cable.
2. Using a BNC-to-Snap-On cable (provided in the service kit) connect the frequency counter to A14J1 (labeled VTO AUX, on the VTO board assembly).
3. Check that A14J1 is between 165 MHz and 195 MHz.
4. Disconnect the cable to A3J4. The VTO frequency should be between 150 MHz and 200 MHz. Check that A3J4 is between –5.6V and –6.8V.
5. If the VTO frequency is incorrect, but the voltage at A3J4 is correct, suspect a failed VTO.
6. If the voltage at A3J4 is incorrect, suspect a failed A3 Summing Amp board (assuming the HP 85102 is working).

Check the VTO at 12 frequencies

Use a power supply and a frequency counter to check the VTO as follows:

1. Inject a –1 to –12V DC voltage (in –1 volt steps) into the A14 VTO Drive (A14J2).
2. Monitor A14J1 to verify that the VTO steps through its range of 65 MHz to 300 MHz (about –21.3 MHz/volt). Figure 5-2 illustrates the relationship of voltage at A14J2 to VTO oscillation frequency.

NOTE

If a power supply is unavailable, use the –1 to –10V DC available from the AUX OUT on the rear panel of the HP 85102. For more information on this feature please refer to the Operating and Programming Manual of the HP 8510B/C manual set.

CAUTION Any positive voltage injected into the VTO drive will damage the VTO.

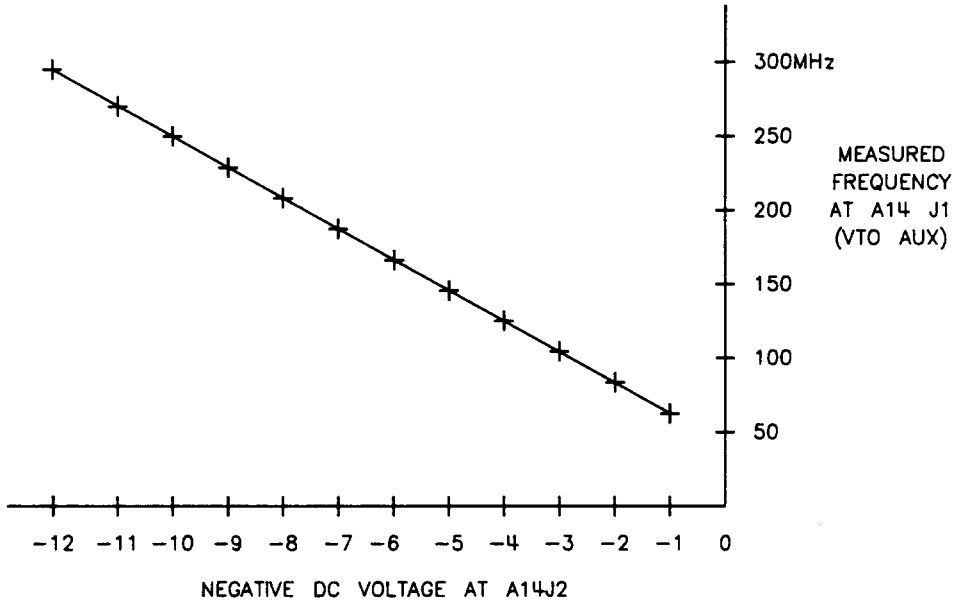


Figure 5-2 VTO Voltage-to-Frequency Relationship

Nominal Programmed Source Power

The HP 8516A uses fixed source power. It instructs the source to provide a 0 to +10 dBm ramp from 45 MHz to 20 GHz, and a constant +10 dBm from 20 GHz to 40 GHz.

The source power may be varied using the RPG (rotary pulse generator knob) on the HP 8510B/C Network Analyzer, by +5 dBm and –10 dBm, but caution must be exercised not to exceed the damage level of the switch-doubler. When the power is varied, the shape of the source output remains constant, that is, there is still a 10 dBm ramp from 45 MHz to 20 GHz. For example, the ramp may extend from –2 dBm to 8 dBm.

CAUTION

The Switch Doubler can be DAMAGED by a DC voltage input, or by a power level input greater than +15 dBm.

Test Set Assembly Replacement Procedures

This section contains replacement procedures for the HP 8516A test set that are more difficult to replace. The procedures are numbered as shown below:

(1) Bias tee

(2) Coupler

(3) Switch/splitter

(4) Frequency converter

(5) Regulator board assembly

(6) Capacitor

(7) 3.5 mm RF connectors

(8) Switch/Doubler interface board

(9) Switch/Doubler

(10) 2.4 mm Test Port connector

(11) Fan

(12) Power Transformer

CAUTION

Electrostatic discharge (ESD) can damage or destroy electronic components. All work on electronic assemblies should be performed at a static-safe workstation. Refer to “Operating and Safety Precautions” on page 1-8 for more information on preventing ESD. Figure 5-3 shows an example of and ESD workstation.

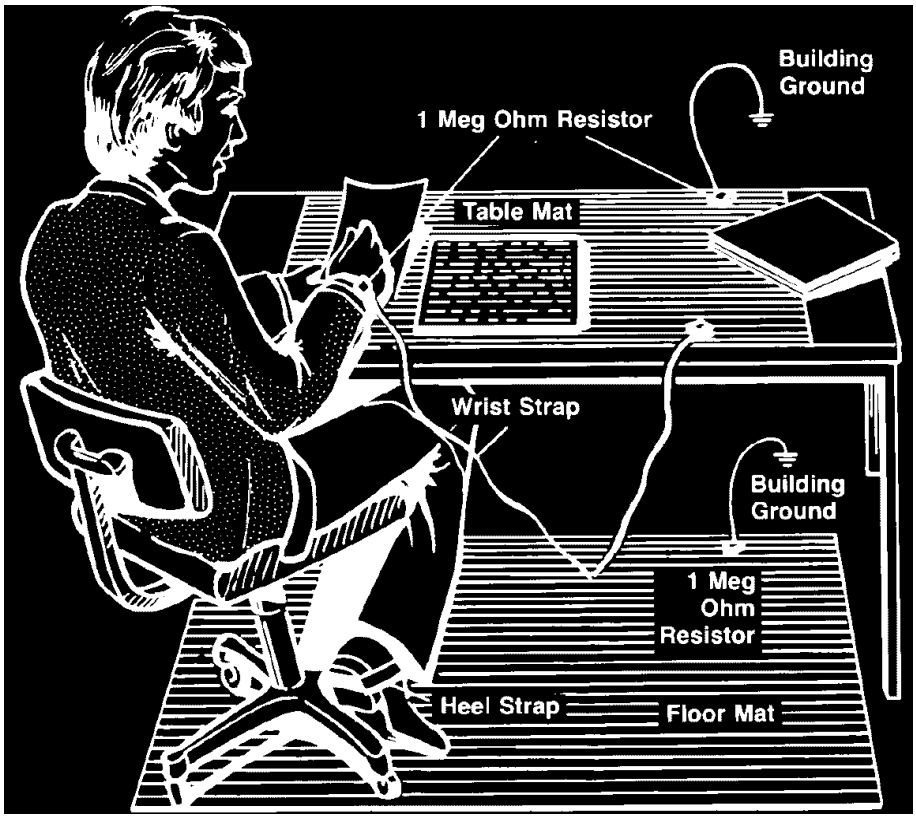


Figure 5-3 Example of ESD-Safe Workstation

The assemblies handled in this procedure are very sensitive to damage by static electricity. They may or may not continue to function if subjected to an electrostatic discharge. In any case, an electrostatic discharge will impair the reliability of these assemblies. Always perform the following steps in order.

1. Ground the work area and yourself to prevent electrostatic damage to the microcircuits.
2. Turn the test set OFF.
3. Disconnect the power cord.
4. Remove the top cover.
5. Reverse the following procedures to install parts.
6. All 3.5 mm and 2.4 mm connections are torqued to 90 N-cm (8 in.-lb.).

Exercise caution when handling semi-rigid coax cables. They are easily bent.

Equipment Needed But Not Supplied

The table below lists all equipment needed for replacing the various assemblies documented in the procedures in this section. Use Figure 5-4 to locate all major assemblies in the test set.

Tools	Used With	HP Part Number
2 point pozidriv	all components	8710-0900
1 point pozidriv	all components	8710-0899
5/16 inch torque wrench, 10 in.-lb	all components	8710-1655
anti-static mat	all components	9300-0797
wrist strap	all components	9300-1257
clip lead	capacitors	any supplier
9/16 inch nut driver	connector repair	8720-0008
1/2 inch torque wrench, 25 in.-lb.	connector repair	8710-1581
3.5 mm connector gauge	connector repair	1250-1862
connector cleaning kit	connector repair	92193Z
100Ω 20 watt resistor	capacitor	0819-0019
1 inch torque wrench, 72 in.-lb.	removal coupler removal	MTB 100 72lbinE[1]

1. Order from Mountz Company, 1080 North 11th Street, San Jose, CA 95112

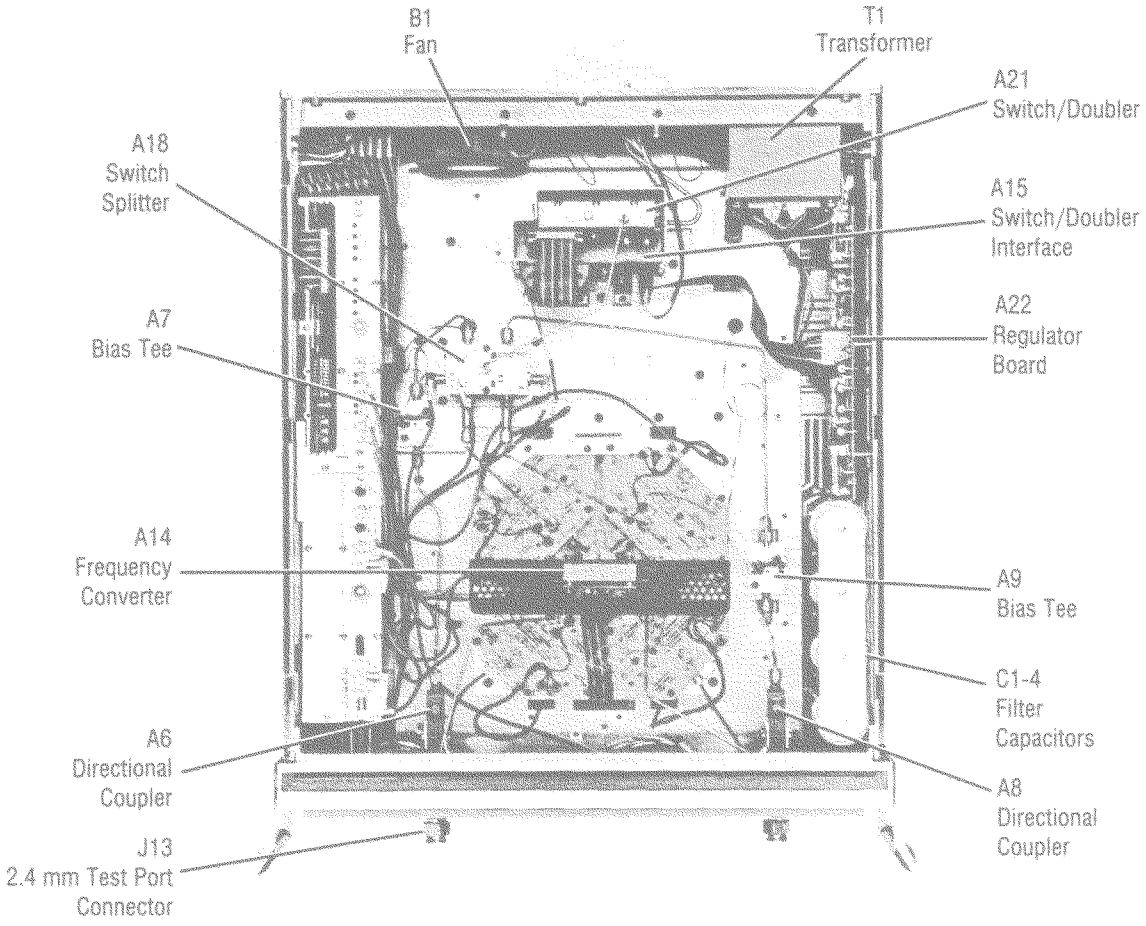


Figure 5-4 General Test Set Component Location Diagram (Top View)

(1) Bias Tee

1. Unsolder the wire connected to the bias tee.
2. Loosen the nuts (2) on both sides of the bias tee.
3. Disconnect the two semi-rigid cables from the bias tee and remove the tee from the test set.

(2) Coupler

1. Remove the two semi-rigid cables attached to the coupler.
2. Remove the coupler support bracket.
3. Carefully loosen the nut connecting the coupler to the front panel with the 5/16 inch torque wrench.
4. Remove the coupler away from the front panel and lift it out of the test set.

(3) Switch/Splitter

1. Remove the five semi-rigid cables and the three flexible cables from the switch/splitter with the 5/16 inch wrench. (Reposition any other cables as required to ease removal.)
2. Remove the four screws which attach the switch/splitter mounting bracket to the top deck.
3. Remove the switch/splitter and bracket from the test set.
4. Remove the bracket from the switch/splitter before sending the switch/splitter to HP for repair.

(4) Frequency Converter

The frequency converter consists of a VTO (voltage-tuned oscillator) assembly and four samplers.

CAUTION

Electrostatic discharge (ESD) can damage or destroy electronic components. All work on electronic assemblies should be performed at a static-safe workstation. Refer to “Operating and Safety Precautions” on page 1-8 for more information on preventing ESD.

The assemblies handled in this procedure are very sensitive to damage by static electricity. They may or may not continue to function if subjected to an electrostatic discharge. In any case, an electrostatic discharge will impair the reliability of these assemblies. Always perform the following steps in order.

1. Remove the four semi-rigid cables from the four samplers.
2. Remove the in-line attenuators from the samplers.
3. Remove the six flexible cables from the frequency converter by gently pulling on the gold connector.
4. Unplug the ribbon cable near the front panel.
5. Unplug the four harnessed (multi-colored) wire and socket assemblies.
6. Remove the four frequency converter mounting plate screws and the frequency converter bracket screw that fastens the frequency converter to the chassis. Lift the frequency converter out of the test set.
7. Remove the frequency converter bracket by removing the two (2) pozidriv screws before sending the frequency converter in for repair.

(5) Regulator Board Assembly

1. Unplug the transformer socket from the regulator board.
2. Remove the three mounting screws from the top edge of the regulator board.
3. Remove the regulator board. (It may be necessary to partially back out one of the transformer mounting screws for clearance.)

(6) Filter Capacitors

1. Set the test set rightside up and pull the metal and plastic cover off the capacitors.
2. Turn the test set upside down and remove the bottom cover.
3. Discharge each capacitor by attaching one end of an insulted clip lead to the chassis of the instrument and the other end of the clip lead to the 100Ω 20 watt resistor. Use this resistor to discharge each capacitor terminal (large pozidriv screw on the bottom side of test set). Each capacitor has two (2) terminals. **Discharge each capacitor terminal**. It will take approximately six seconds per capacitor to discharge.
4. To remove a capacitor, remove the corresponding pair of screws and pull the capacitor out of the test set.

(7) 3.5 mm RF Input Connector Repair

Refer to Figure 5-5 and the following text to repair 3.5 mm connectors.

Disassembly

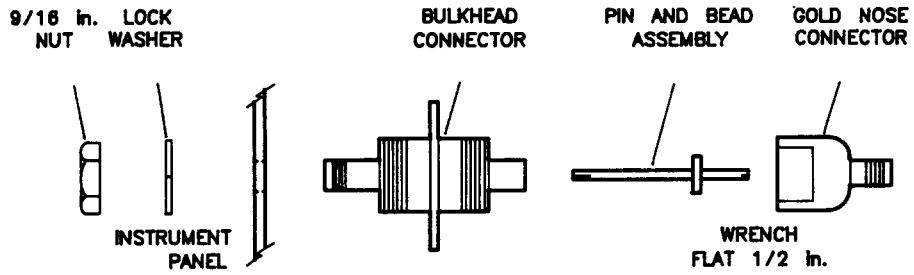


Figure 5-5 Exploded Diagram of 3.5 mm Connector

1. Remove any attached cables from the connector to be replaced.
2. Use a 1/2 inch wrench to loosen the gold nose connector. Remove the pin and bead assembly from the connector. If only the pin and bead assembly needs to be replaced, continue with step 6.
3. From the inside of the test set, use the 9/16 inch nut driver to loosen the 9/16 inch nut and remove the rest of the connector.
4. Use the part numbers given in the replaceable parts section of this manual.

Assembly

5. Assemble the bulkhead connector, lock washer and nut. Tighten the nut using the 9/16 inch nut driver 506 N-cm (45 in.-lb).
6. Clean the pin and bead assembly (using the procedures described in the *Microwave Connector Care Manual*, provided with your HP 8510B manual set). Insert the pin and bead assembly into the gold nose connector. Attach this assembly to the bulkhead connector. Torque the bulkhead connector to 281 N-cm (25 in.-lb.).
7. Clean the mating surfaces with liquid freon or alcohol and lint-free swabs.
8. Check the pin depth of the gold nose connector. The pin depth specification is 0.0000 to +0.0030 inch.

NOTE

If the pin depth is not within specification, do not shim. Instead, install another pin and bead assembly.

9. Reconnect the cables disconnected in step 1.

(8) Switch/Doubler Interface Board

1. Remove the semi-rigid cable connecting the doubler to the switch/splitter. Remove the three flexible coax cables attached to the switch splitter.
2. Unplug the four cables connected to the board and move them out of the way.
3. Remove the two screws securing the board to the test sets top deck.
4. Pull the board straight up and remove it from the test set.

(9) Switch/Doubler

1. Unplug all cables attached to the doubler interface board.
2. Remove all of the semi-rigid cables attached to the Switch/Splitter, Doubler and Bias Tee (on Port 1).
3. Remove the seven screws securing the top deck to the main deck of the test set.
4. Tilt the top deck assembly out of the test set. Be careful not to crimp the wire attached to the Bias Tee.

5. Remove the four screws that attach the doubler to the top deck.
6. Lift the doubler out of the top deck and the test set.

(10) 2.4 mm Test Port Connector

1. Remove the Coupler (2).
2. Carefully loosen the nut on the front of the test set with the 1-inch torque wrench. Remove the nut and washer.
3. Remove the test port connector from the test set.
4. Regauge the test port connector assembly after replacement. The specification is –.0001 to –.0007 inch recession. If the connector is not within specification, do not repair. Instead, install another connector assembly.

(11) B1 Fan

WARNING

Turn the test set OFF and disconnect the power cord from the mains. Electrocution can result if power is not removed from the test set prior to this procedure.

NOTE

To replace the fan, transformer T1 must be removed so that the ends of the fan wires may be unsoldered from line module FL1. Refer to the Replaceable Parts section of this manual for a detailed view of the B1 fan and T1 transformer hardware stackup.

1. Turn the test set on its right-hand side.
2. Use a 5/16 inch open end wrench to remove the hardline cables connected between couplers A7and A9 and bulkhead connectors J2 and J5.
3. Unplug the transformer connector mating with connector J2 on the A15 regulator board assembly.
4. Use a large pozi-driv screwdriver to remove the four screws and washers holding transformer T1 onto the rear panel.
5. Use a large pozi-driv screwdriver to remove the one screw holding the transformer angle bracket to the main deck. Carefully remove the transformer from the test set and put it on the bench close to the test set.

The transformer wires soldered to the FL1 line module are short, so do not pull on the transformer too much.

6. Strip the heat shrink tubing off of the two fan wires and unsolder them from line module FL1. Use wire cutters to cut any cable ties holding the fan wires to nearby cables.
7. Use a small pozi-driv screwdriver to remove the screw and lockwasher securing the green/yellow fan ground wire to the top of the rear panel frame.
8. Use a small pozi-driv screwdriver to remove the four screws holding fan B1 to the rear panel and remove the fan.

(12) T1 Power Transformer

WARNING

Turn the test set OFF and disconnect the power cord from the mains. Electrocution can result if power is not removed from the test set prior to this procedure.

1. Turn the test set on its right-hand side.
2. Use a 5/16 inch open end wrench to remove the hardline cable connected between coupler A7 and bulkhead connector J2.
3. Unplug the transformer connector mating with connector J2 on the A15 regulator board assembly.
4. Use a large pozi-driv screwdriver to remove the four screws and washers holding transformer T1 onto the rear panel.
5. Use a large pozi-driv screwdriver to remove the one screw holding the transformer angle bracket to the main deck. Carefully remove the transformer from the test set and put it on the bench close to the test set. The transformer wires soldered to line module FL1 are short, so do not pull on the transformer too much.
6. Strip the heat shrink tubing off of the transformer wires soldered to line module FL1 and unsolder them. Unsolder the transformer ground wire connected to the chassis side rail.

7. Remove transformer T1. When replacing the transformer, refer to Figure 5-6, which illustrates the locations of the various wires connected to line module FL1.

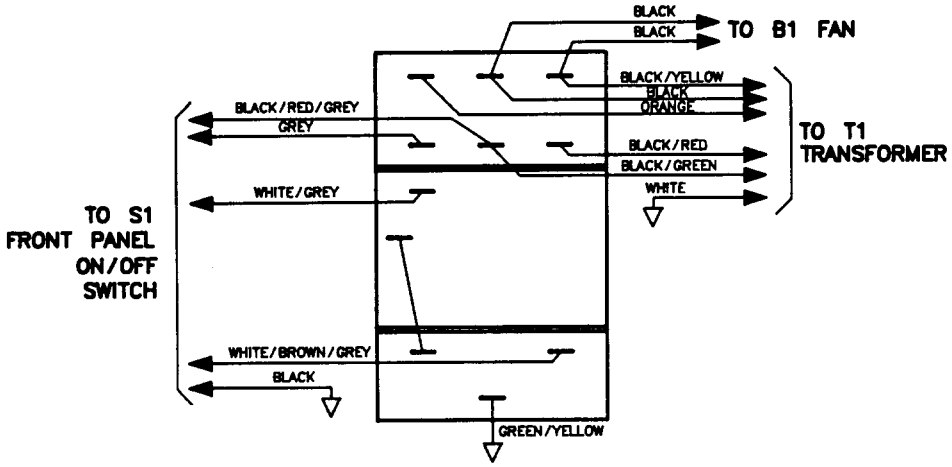


Figure 5-6 Wire Connections to Line Module FL1

Unratioed Power Test

This procedure allows you to check the output power level of each test set sampler/mixer assembly and its associated IF amplifier alone. The normal power level display, S11 for example, is a ratio (in this case, b1/a1). The network analyzer automatically powers and phaselocks a predefined port or ports to make the measurement selected.

Ratioed measurements provide useful data but they can mask certain malfunctions. Assume, for example, the task is to measure an S-parameter at a specific power level. If the test set has a 20 dB power hole due to a faulty RF input connector, that deficiency would be invisible (ratioed out) in a ratioed measurement. But the data would be incorrect; it would not have been taken at the specified power level.

Similarly, troubleshooting system faults in a ratioed measurement mode can be deceptive. The solution is to check each channel singly, to check the power in an unratioed mode. To do so requires specifying which port to drive power to and which channel to achieve phase lock with. The following procedures include steps to redefine parameters as required.

The HP 8516A Test Set is unique among test sets produced by Hewlett-Packard, in that as part of the design criteria, port 1 and port 2 were not phase balanced. Because of this, variations will occur when examining the output of the individual samplers or when comparing the S-parameters. Additionally, the HP 8516A option 003, High Forward Dynamic Range Configuration, has the port 2 coupler reversed to optimize dynamic range in the forward direction. Because the b2 sampler is connected to the coupler throughpath instead of the coupled arm, there is less isolation between the b2 sampler and port 2 and the power level will be higher than b1. As a result, "sampler bounce", appearing as an occasional spur related to the VTO frequency can be worse in this "asymmetrical" test set than the standard symmetrical test set.

Figure 5-7, Figure 5-10, and Figure 5-11 show which assemblies are parts of the signal path of each channel. Realizing that some assemblies are common to two, or all four, channels is a powerful troubleshooting tool. Figure 5-8 and Figure 5-9, following these procedures, show typical traces.

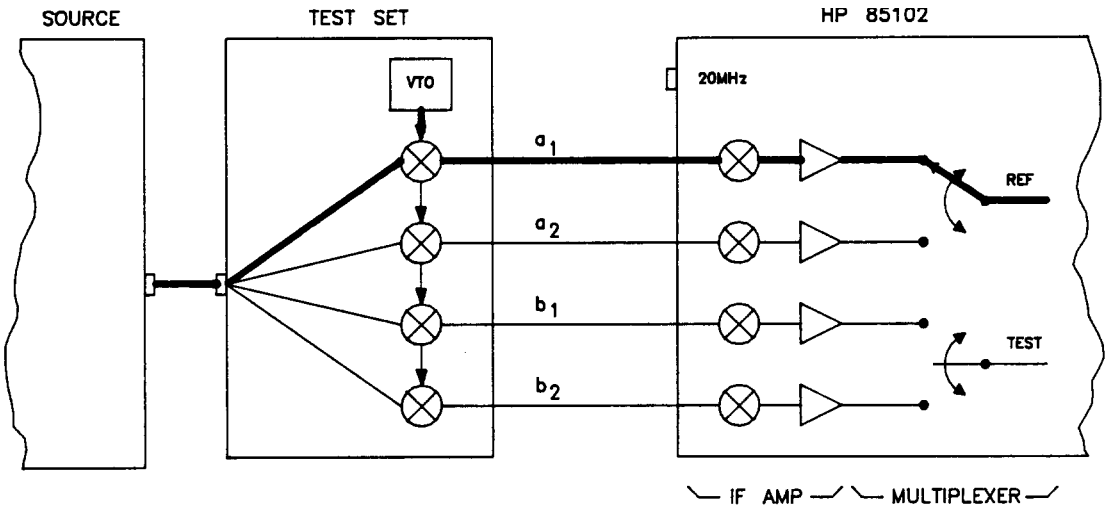


Figure 5-7 Simplified Signal Path of Unratioed Power Test

Sampler Test

1. Press **[PRESET]**, ***{STIMULUS}***, **[MENU]** on the HP 85102 to preset the HP 8510 and access the STIMULUS menu.

   HP 8340/41 systems: press **[STEP**] on the HP 85101 to put the source in step mode.

2. To check all of the samplers in an S-parameter test set, first redefine the a2 and b2 phase lock and drive paths:

   Press ***{PARAMETER}***, **[MENU]**, **[User 3 a2]**, **[REDEFINE PARAMETER]**, **[DRIVE]**, **[Port 2]**, **[PHASE LOCK]**, **[a2]**, **[REDEFINE DONE]** to redefine a2.

   Press **[User 2 b2]**, **[REDEFINE PARAMETER]**, **[DRIVE]**, **[Port 2]**, **[PHASE LOCK]**, **[a2]**, **[REDEFINE DONE]** to redefine b2.

3. Connect an open (or short) to port 1 and port 2.

4. Press **[User 1 a1]**, **[User 2 b2]**, **[User 3 a2]**, and **[User 4 b1]** to check the samplers indicated, the RF signal paths are shown in Figure 5-10 and Figure 5-11. Each trace should typically look like the examples in Figure 5-8 and Figure 5-9, within ±5 dB.

b1 Thru Test

5. Connect a thru (two RF cables) from port 1 to port 2.
6. Press ***{PARAMETER}***, **[MENU]**, **[USER 4 b1]**, **[REDEFINE PARAMETER]**, **[DRIVE]**, **[PORT 2]**, **[PHASELOCK]**, **[a2]**, **[REDEFINE DONE]**, to observe the b1 power level trace through the path indicated by Figure 5-10 and Figure 5-11.

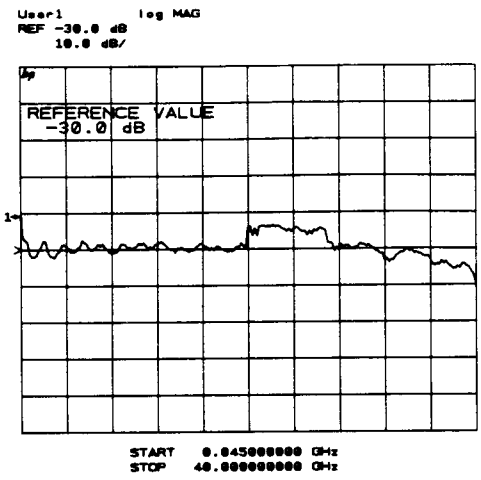
b2 Thru Test

7. Press ***{PARAMETER}***, **[MENU]**, **[USER 2 b2]**, **[REDEFINE PARAMETER]**, **[DRIVE]**, **[PORT 1]**, **[PHASELOCK]**, **[a1]**, **[REDEFINE DONE]** to observe the b2 power level trace through the path indicated by Figure 5-10 and Figure 5-11.

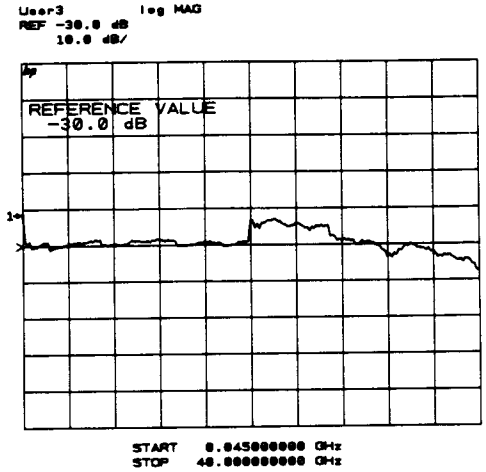
   Make sure that you redefine the parameters back to the original conditions for a1, b1, a2, and b2.

NOTE

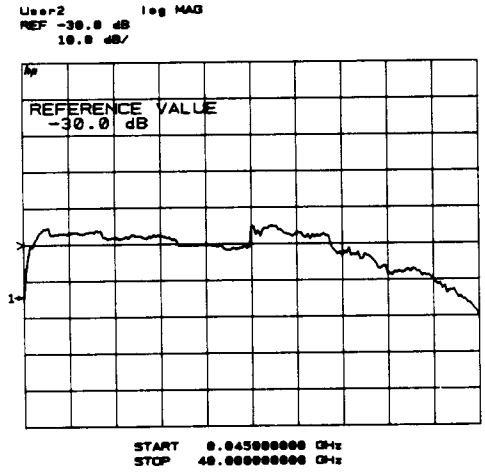
If one or more channels look abnormal, refer to the procedure “If Any User Channel Appears Faulty” on page 5-26.



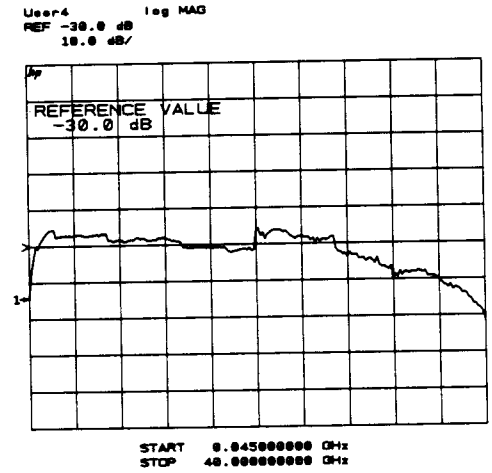
a1



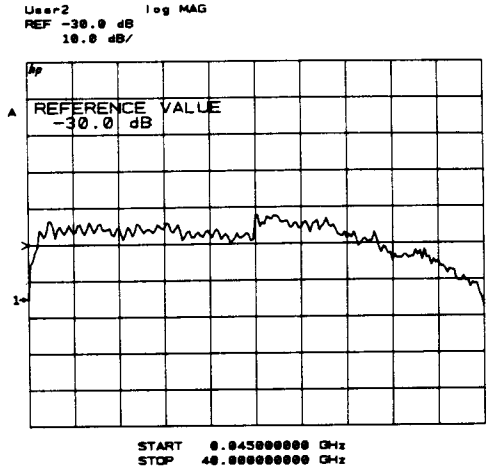
a2



Standard b2 Thru

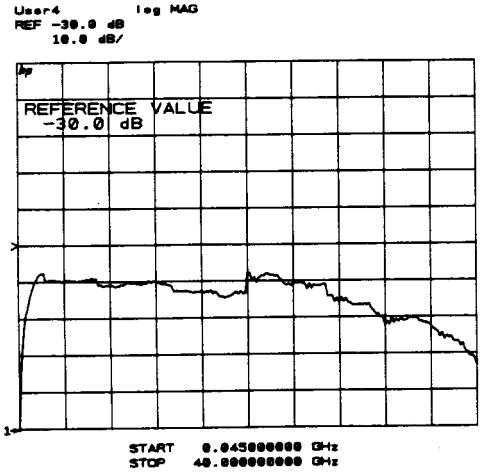


Standard b1 Thru

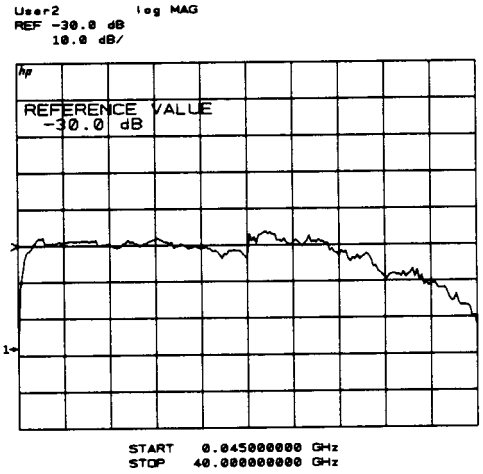


Standard b2 Reflection

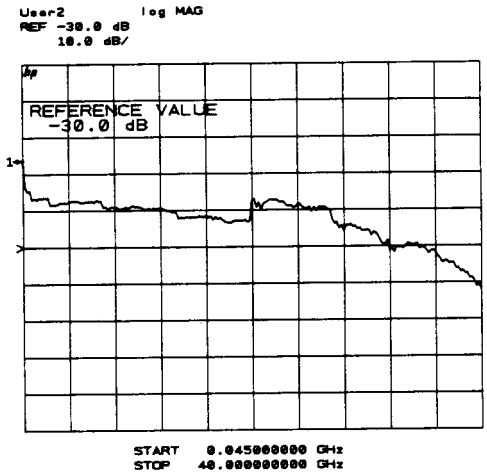
Figure 5-8 Typical Test Set Unratioed Power Test Traces



Option (003) b1 Thru



Option (003) b2 Reflection



Option (003) b2 Thru

Figure 5-9 Typical Test Set Unratioed Power Test Traces Option 003

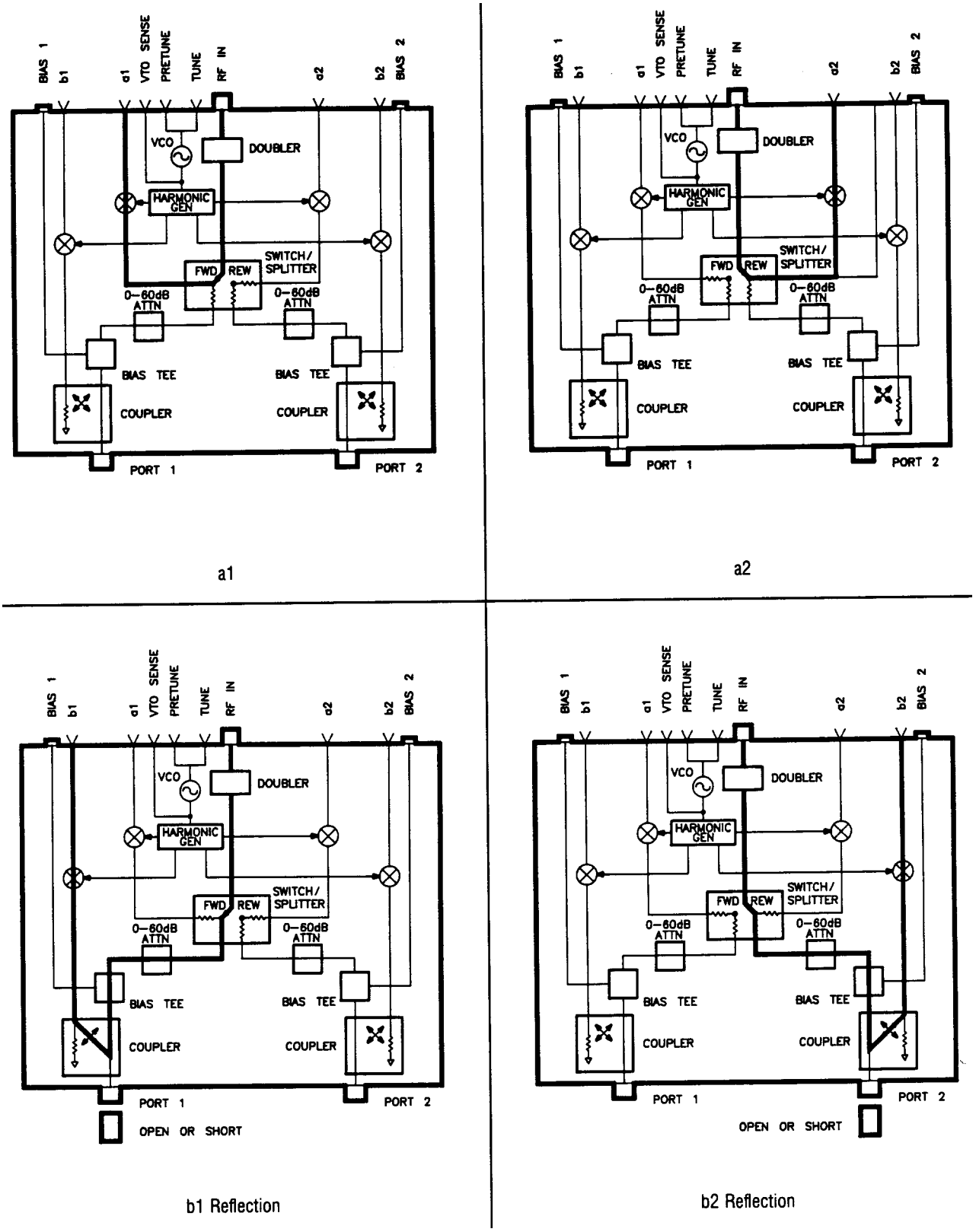


Figure 5-10 User Signal Paths in Test Sets

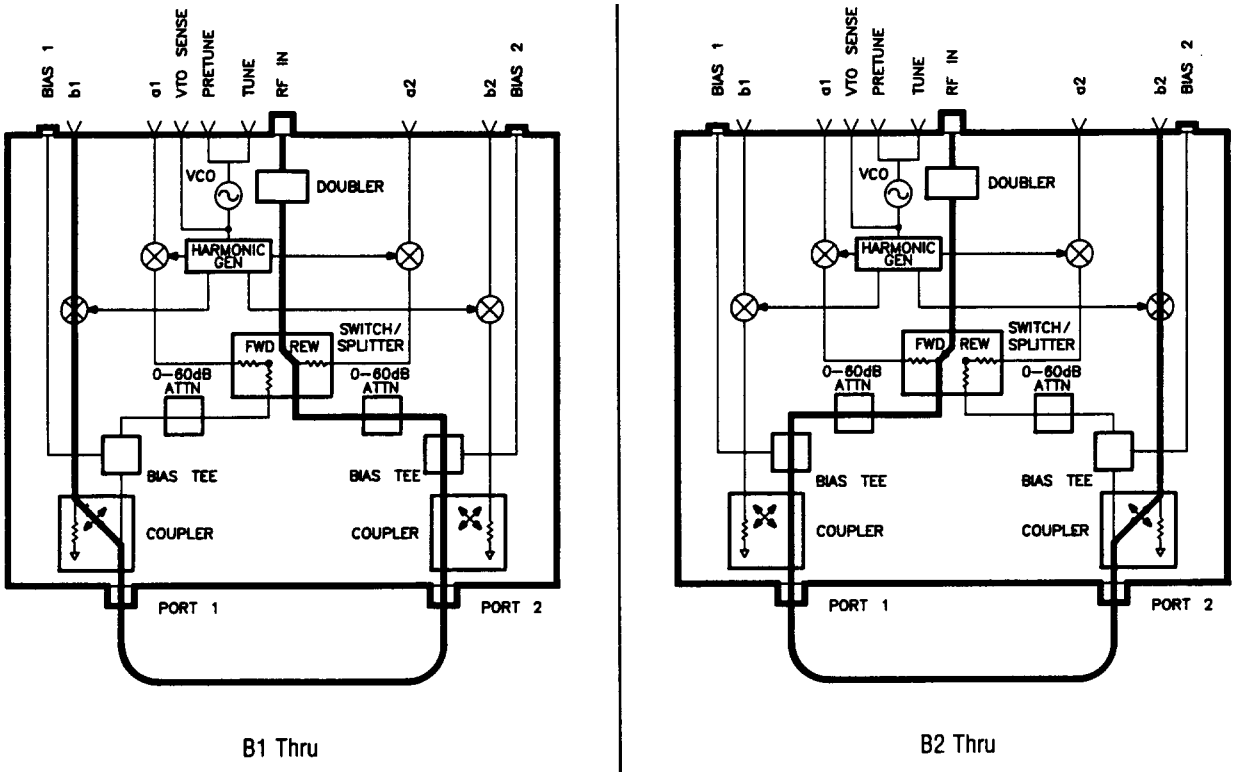


Figure 5-11 User Signal Paths in Test Sets

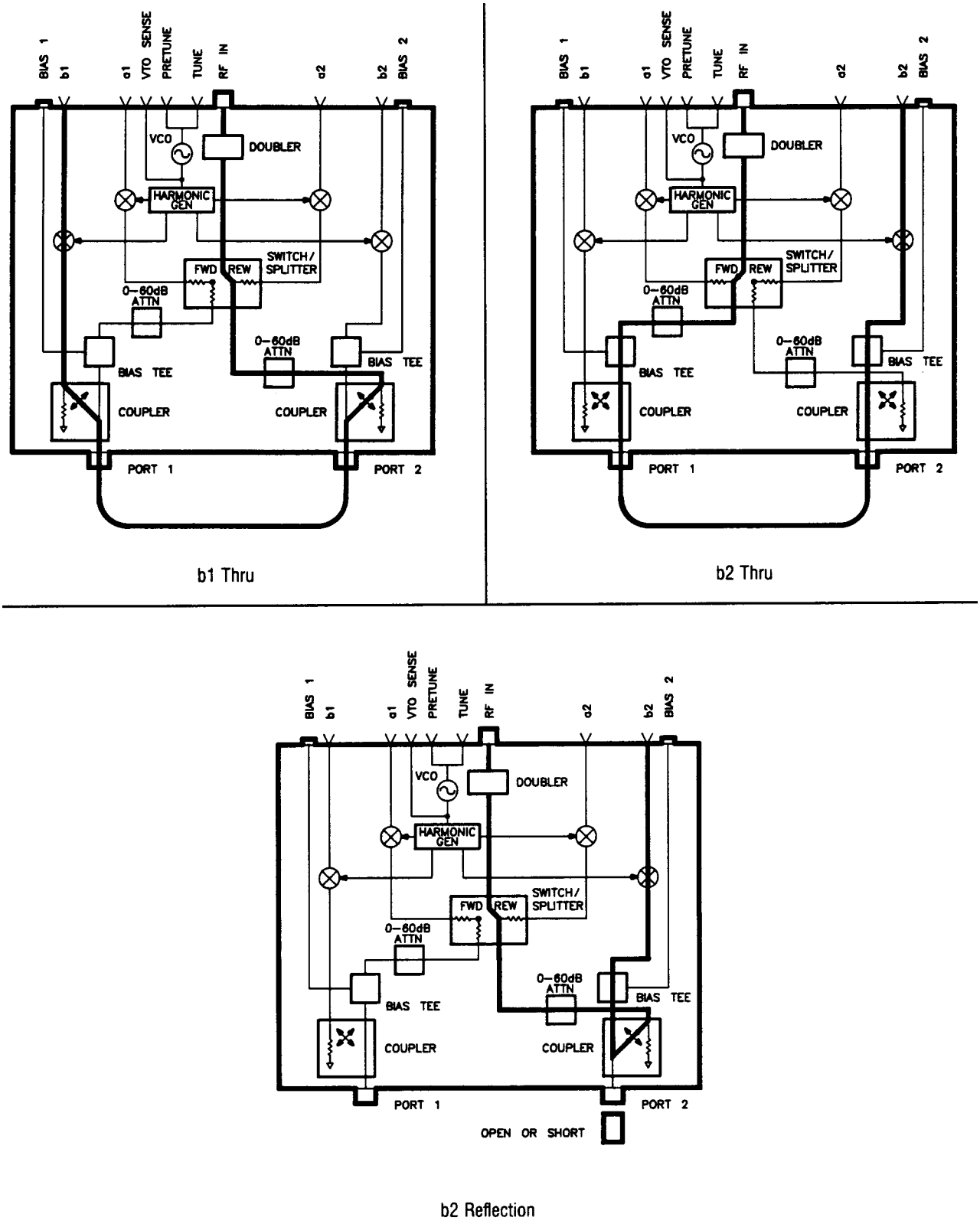


Figure 5-12 User Signal Paths in Test Sets Option 003

If Any User Channel Appears Faulty

If one or more user channels appear faulty, the problem might be with the source, test set, or HP 85102B IF/detector. The service adapter is a source/test set emulator. It provides the same 20 MHz signal to the HP 85102B as the test set and source. Thus, it indicates whether or not the problem is in the HP 85102B IF/detector.

Equipment

- HP 85102B service adapter (provided in the *HP 8510B Service Manual*, refer to Service Tools)
- BNC to BNC cable

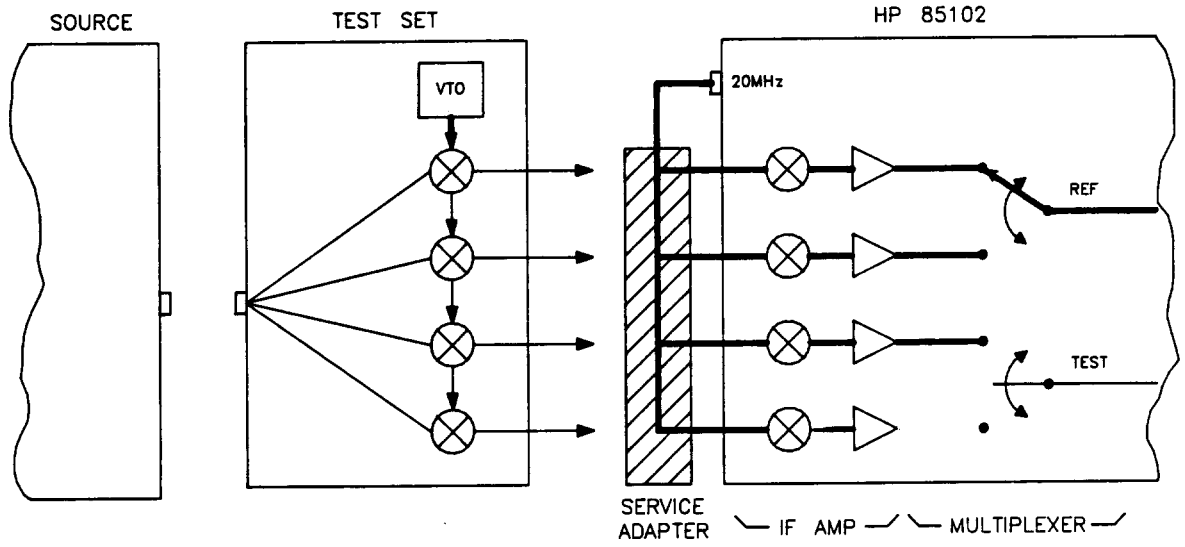


Figure 5-13 HP 85102 Signal Path with Service Adapter

Service Adapter Procedure

1. Connect the HP 85102B service adapter to the HP 85102B rear panel 20 MHz OUT connector and the J2 IF-DISPLAY INTERCONNECT connector.Press **[PRESET]**, **[MARKER]**, ***{STIMULUS}***, **[MENU]**, **[STEP]**, ***{PARAMETER}***, **[MENU]** and each ***{User}*** softkey to observe the unratioed power level of the User1 through User4 channels. The traces should be flat lines, quite close to each other, as indicated by the marker value (typically about –28 ±5 dB).

Service Adapter Conclusions

- *If all of the channels look good* (with the service adapter) and all looked bad in the unratioed power test, the HP 85101 and 85102 are working. The problem is probably source related. Refer to the Source Tests and Service Program sections of the Service Manual to continue troubleshooting the problem.
- *If all four User channels look bad* (with the service adapter), suspect the 20 MHz signal from the A6 clock board assembly. Refer to the paragraph titled HP 85102 IF/Detector Tests in the Service Program section to verify the 20 MHz output.
- *If one or more (but not all) channels look bad*, troubleshoot the HP 85102 by referring to the Service Program and Block Diagrams sections of the service manual. Then recheck the unratioed channel power levels.

  Single channel problems suggest the IF Mixer board corresponding to the User function (channel a1, b1, a1, or a2) is faulty. Refer to the Overall System Block diagram located in the Block Diagrams section of the Service Manual.

  Multiple channel problems indicate the problem is most likely in the circuitry after the IF Mixer boards (for example, the IF amplifiers or synchronous detectors). Refer to the HP 85102A Overall Block Diagram in the Block Diagrams section of the Service Manual.

  Determine whether the failure is in the reference path or the test path.

  Test the suspect board(s) using the procedures provided in the Service Program section. Check the IF Amplifiers and Synchronous Detectors by swapping the reference and test board assemblies (since they are identical) and seeing if the problem moves.

6 Replaceable Parts

Introduction

This section contains information for ordering parts. Exchange Assemblies Available describes how to order assemblies which are available on an exchange basis.

Exchange Assemblies Available

The items below are replaceable on a rebuilt exchange basis at a cost saving. They are not field-repairable. Defective assemblies must be returned for credit to realize the cost savings. Thus, assemblies required for spare parts stock should be ordered by the new assembly part number which is included in the replaceable parts list of this section. Refer to the parts list for the orderable part numbers.

A2	IF multiplexer board assembly, option 001
A3	VTO summing amplifier board assembly
A4	HP-IB board assembly
A5	attenuator/switch driver assembly
A7	bias tee, Port 1
A9	bias tee, Port 2
A14	frequency converter assembly
A15	doubler interface board assembly
A18	switch/splitter
A21	switch doubler
A22	regulator board assembly

Replaceable Parts Lists

The replaceable parts lists consist of tables with illustrations. Use the illustrations to identify the part to be ordered. Each table is arranged in alphanumerical order by reference designator. The reference designator keys the part listed to the illustration. The part number listed is a Hewlett-Packard part number. Quantity refers to the total number of that part in the instrument. The description is a brief written description of the part and may be used for ordering purposes.

Table 6-1

Reference Designations

A	assembly	J	electrical connector, jack
AT	attenuator	MP	miscellaneous part
B	fan	R	resistor
C	capacitor	T	transformer
E	miscellaneous electrical	W	cable, wire
F	part	X	socket
FL	fuse		
	filter		

More comprehensive tables of reference designators and abbreviations are behind the Replacement Parts tab of the *HP 8510B Service Manual*.

Figure 6-2 Major Assemblies

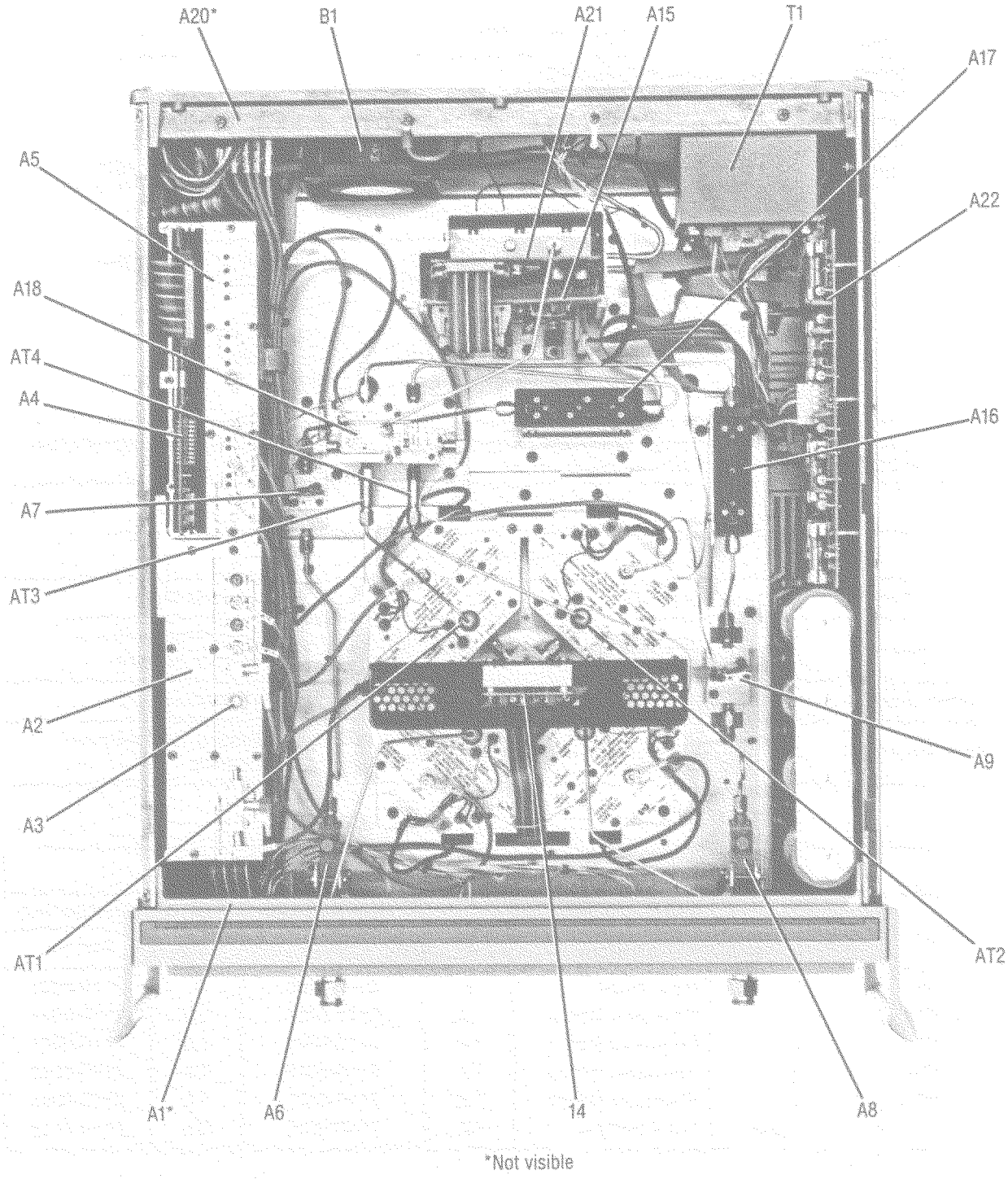

A20*
B1
A21
A15
T1
A17
A5
A22
A18
AT4
A4
A16
A7
AT3
A2
A9
A3
AT1
AT2
A1*
A6
14
A8
*Not visible

Table 6-1 Major Assemblies

Reference Designation	HP Part Number	Qty	Description
			MAJOR ASSEMBLIES
A1	08513-60005	1	BOARD ASSEMBLY, FRONT PANEL (NEW)
A2	08513-60004	1	BD ASSY, USED FOR OPT 001 ONLY
A2	08513-69004	1	BD ASSY, USED FOR OPT 001 ONLY
A3	08513-60008	1	BD ASSY, VTO SUMMING AMPLIFIER (NEW)
A3	08513-69008	1	BD ASSY, VTO SUMMING AMPLIFIER (REBUILT)
A4	085I6-60029	1	BOARD ASSEMBLY, HP-IB (NEW)
A4	08516-69029	1	BOARD ASSEMBLY, HP-IB (REBUILT)
A5	08513-60011	1	BD ASSY, ATTEN/SWITCH DRIVER (NEW)
A5	08513-69011	1	BD ASSY, ATTEN/SWITCH DRIVER (REBUILT)
A6	0955-0422	2	DIRECTIONAL COUPLER 40 GHZ 2.4 MM, PORT 1
A7	5086-7484	2	BIAS TEE, PORT 1 (NEW)
A7	5086-6484		BIAS TEE, PORT 1 (REBUILT)
A8	0955-0422		DIRECTIONAL COUPLER 40 GHZ 2.4 MM, PORT 2
A9	5086-7484		BIAS TEE, PORT 2 (NEW)
A9	5086-6484		BIAS TEE, PORT 2 (REBUILT)
A10			NOT ASSIGNED
A11			NOT ASSIGNED
A12			NOT ASSIGNED
A13			NOT ASSIGNED
A14	5086-7480	1	FREQ. CONV. (SAMPLERS & VTO) (NEW)
A14	5086-6480	1	FREQ. CONV. (SAMPLERS & VTO) (REBUILT)
A15	08516-60034	1	BOARD ASSY, DOUBLER INTERFACE (NEW)
A15	08516-69034	1	BOARD ASSY, DOUBLER INTERFACE (REBUILT)
A16	33325-60001	2	PORT 1 STEP ATTENUATOR
A17	33325-60001	2	PORT 2 STEP ATTENUATOR
Al8	5086-7478	1	SWITCH/SPLITTER (NEW)
Al8	5086-6478	1	SWITCH/SPLITTER (REBUILT)
A20	08513-60006	1	BOARD ASSY, HP-IB INTERCONNECT (NEW)
A21	5086-7472	1	ASSEMBLY, SWITCH DOUBLER (NEW)
A21	5086-6472	1	ASSEMBLY, SWITCH DOUBLER (REBUILT)
A22	08516-60002	1	BOARD ASSEMBLY, REGULATOR (NEW)
A22	08516-69002	1	BOARD ASSEMBLY, REGULATOR (REBUILT)
AT1	08516-60021	1	2.4MM 6 dB ATTENUATOR
AT2	08516-60021	1	2.4MM 6 dB ATTENUATOR
AT3	08516-60022	1	2.4MM 13 dB SHAPED ATTENUATOR
AT4	08516-60022	1	2.4MM 13 dB SHAPED ATTENUATOR
B1	08513-20031	1	FAN-TBAX 34-CFM 115V 50/60-HZ 1.5KVDIEL
T1	9100-4723	1	POWER, TRANSFORMER

Figure 6-3 Cable Assemblies

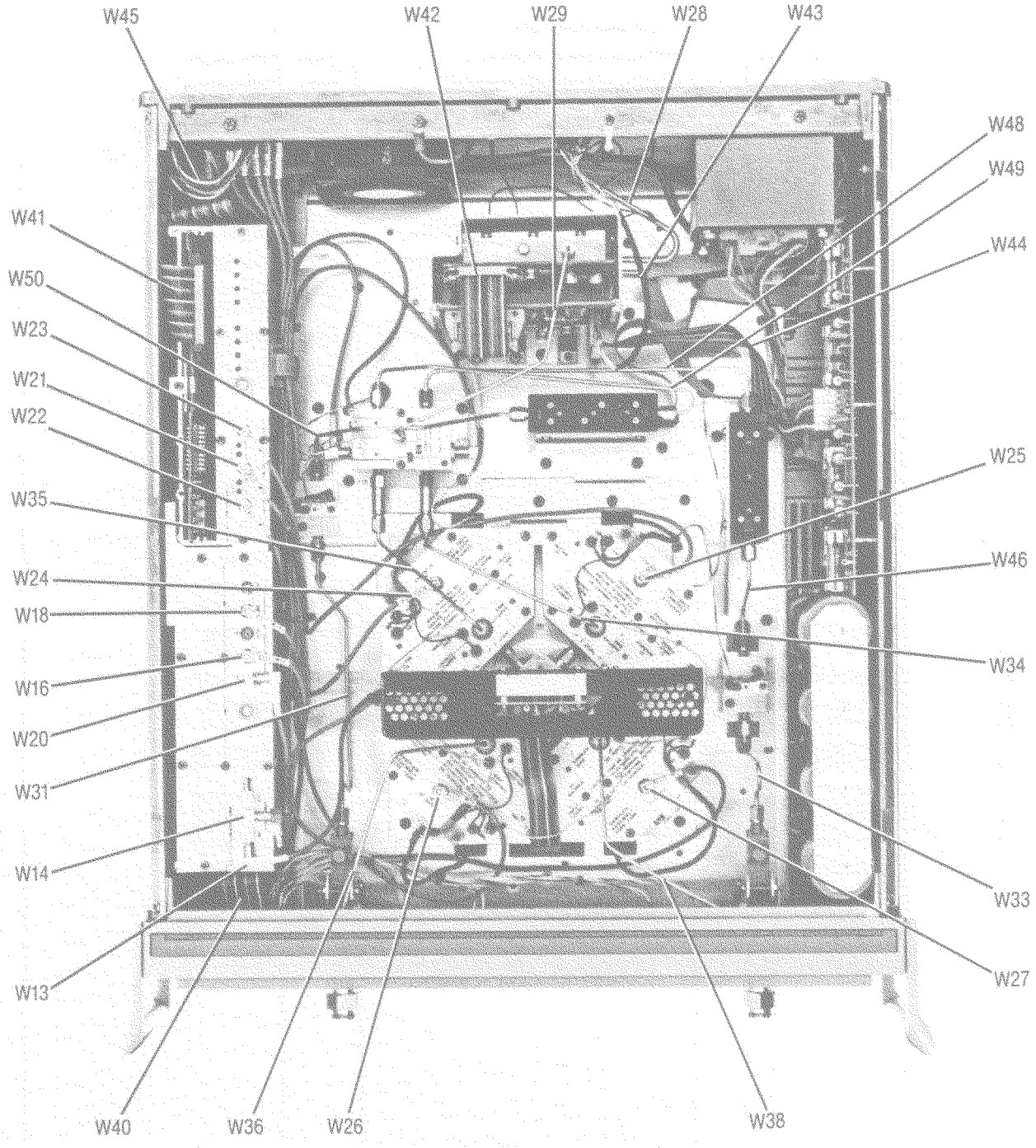

W45
W42
W29
W28
W43
W48
W49
W44
W41
W50
W23
W21
W22
W25
W35
W46
W24
W18
W34
W16
W20
W31
W14
W33
W27
W13
W40
W36
W26
W38

Table 6-2 Cable Assemblies

Reference Designation	HP Part Number	Qty	Description
CABLE ASSEMBLIES			
W1-W12			THESE CABLES ARE USED FOR OPTION 001
W13	08513-60133	1	CA ASSEMBLY A3J1 TO A14J1
W14	08513-60134	1	CA ASSEMBLY A3J2 TO J11A7
W15			THIS CABLE IS USED FOR OPTION 001
W16	08513-60136	1	CA ASSEMBLY A3J5 TO J11A5
W17			THIS CABLE IS USED FOR OPTION 001
W18	08513-60138	1	CA ASSEMBLY A3J7 TO J11A6
W19			THIS CABLE IS USED FOR OPTION 001
W20	08513-60140	1	CA ASSEMBLY A3J4 TO A14J2
W21	08513-60141	1	CA ASSEMBLY A5J2 TO A18J4
W22	08513-60142	1	CA ASSEMBLY A5J1 TO A18J3
W23	08513-60143	1	CA ASSEMBLY A5J3 TO A18J6
W24	08513-60144	1	CA ASSEMBLY A12J3 TO J11A1
W25	08513-60145	1	CA ASSEMBLY A13J3 TO J11A4
W26	08513-60146	1	CA ASSEMBLY A10J3 TO J11A2
W27	08513-60147	1	CA ASSEMBLY A11J3 TO J11A3
W28	08516-20003	1	CA RF J1 TO A22
W29	08516-20006	1	CA RF A22 TO A18
W31	08516-20011	1	CA RF A7 TO A8
W33	08516-20012	1	CA RF A8 TO A9
W34	08516-20009	1	CA RF A18 TO A13
W35	08516-20010	1	CA RF A18 TO A12
W36	08516-20007	1	CA RF A8 TO A10
W38	08516-20008	1	CA RF A8 TO A11
W40	08513-60013	1	CA ASSEMBLY A1 TO A19
W41	08513-60036	1	CA ASSEMBLY A4 TO A20
W42	08516-60007	1	CA ASSEMBLY A21 TO A22
W43	08516-60006	1	CA ASSEMBLY A21 TO REAR PANEL
W44	08516-60008	1	CA ASSEMBLY A22 TO A15
W45	08513-60014	1	CA ASSEMBLY J10 TO J11 (REAR PANEL)
W46	08516-20024	1	CA ASSEMBLY A9 TO A17
W48	08516-20026	1	CA ASSEMBLY A17 TO A18
W49	08516-20027	1	CA ASSEMBLY A16 TO A18
W50	08516-20028	1	CA ASSEMBLY A16 TO A7

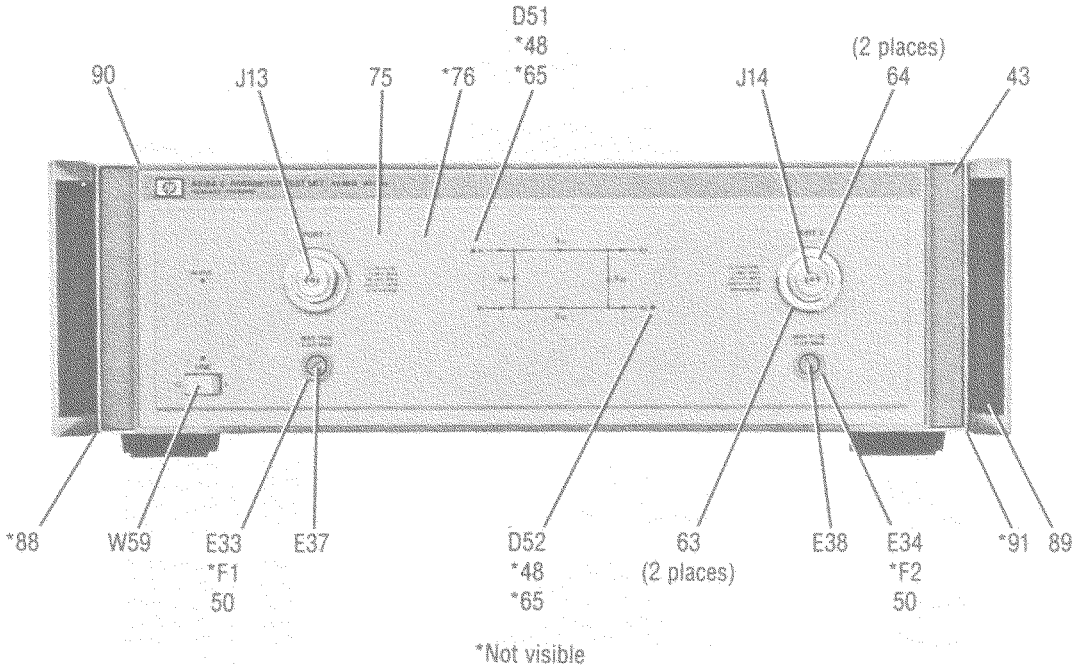


Figure 6-4 Front View, External

Table 6-3 Front View, External

Reference Designation	HP Part Number	Qty	Description
			FRONT VIEW
DS1	1990-0858	1	LED-LAMP LUM-INT=15UCD IF=25MA MAX
DS2	1990-0858	1	LED-LAMP LUM-INT=15UCD IF=25MA MAX
E33,E34	2110-0565	1	FUSEHOLDER
E37	2110-0565	1	FUSEHOLDER CAP 12A MAX FOR UL
E38	2110-0565	1	FUSEHOLDER CAP 12A MAX FOR UL
F1	2110-0012	1	FUSE.5A 250V NTD 1.25X.25 UL
F2	2110-0565	1	FUSE.5A 250V NTD 1.25X.25 UL
J13,J14	08516-60005	2	CONNECTOR ASSY, 2.4MM TEST PORT FOR TEST SET SERIAL #2820A AND LOWER
	08516-60018	2	CONNECTOR ASSY, 2.4MM TEST PORT FOR TEST SET SERIAL #2903A AND GREATER
W59	85102-60226	1	CABLE ASSY LINE SWITCH
43	5021-8747	1	FRONT BEZEL
48	1450-0615	2	RETAINER LED 0.75 IN LG; 0.38 IN
50	08514-20024	1	TEST PORT FLANGE
63	5021-3427	2	WSHR-TS PORT CONN
64	5021-3428	2	NUT FLANGE TS PORT CONN
65	08340-40002	2	MOUNT LED
75	08516-00011	1	FRONT PANEL
76	08516-00012	1	SUB PANEL
88	5062-3757	1	COVER ASSY SIDE

Table 6-3 Front View, External

Reference Designation	HP Part Number	Qty	Description
89	5062-3799	2	HANDLE ASSY FRONT
90	08513-00040	1	TEST SET COVER TOP
91	08513-00041	1	COVER SIDE PERF

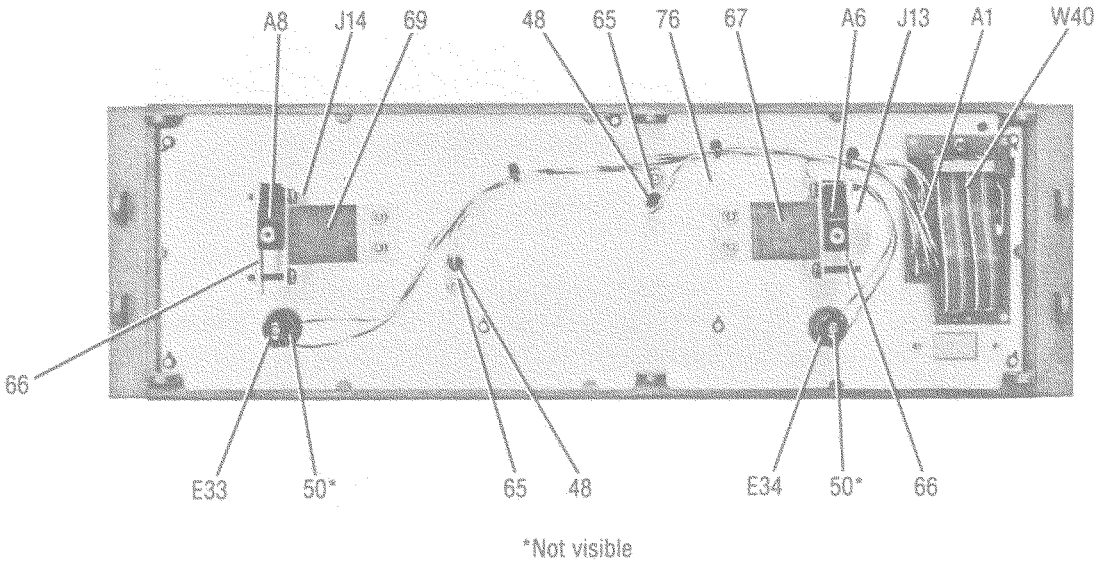


Figure 6-5 Front View, Internal

Table 6-4 Front View, Internal

Reference Designation	HP Part Number	Qty	Description
			FRONT INTERNAL
A1	08513-60005	1	BOARD ASSEMBLY, FRONT PANEL
A6	0955-0422	1	DIRECTIONAL COUPLER 40 GHz 2.4MM PORT 1
A8	0955-0422	1	DIRECTIONAL COUPLER 40 GHz 2.4MM PORT 2
E33	08513-80028	2	FUSEHOLDER
E34	08513-80028		FUSEHOLDER
J13,J14	08516-60005	2	CONNECTOR ASSY, 2.4MM TEST PORT FOR TEST SET SERIAL #2820A AND LOWER
	08516-60018	2	CONNECTOR ASSY, 2.4MM TEST PORT FOR TEST SET SERIAL #2903A AND GREATER
W40	08513-60013	1	CA ASSY A1 TO A19
48	1450-0615	2	RETAINER LED 0.75 IN LG; 0.38IN
50	2110-0569	2	FUSEHOLDER COMPONENT NUT; THREAD
65	08340-40002	2	MOUNT LED

Table 6-4 Front View, Internal

Reference Designation	HP Part Number	Qty	Description
66	08516-00010	2	COUPLER CLAMP
67	08516-00009	2	COUPLER SUPPORT
76	08516-00012	1	SUB PANEL

Figure 6-6 Rear View, External

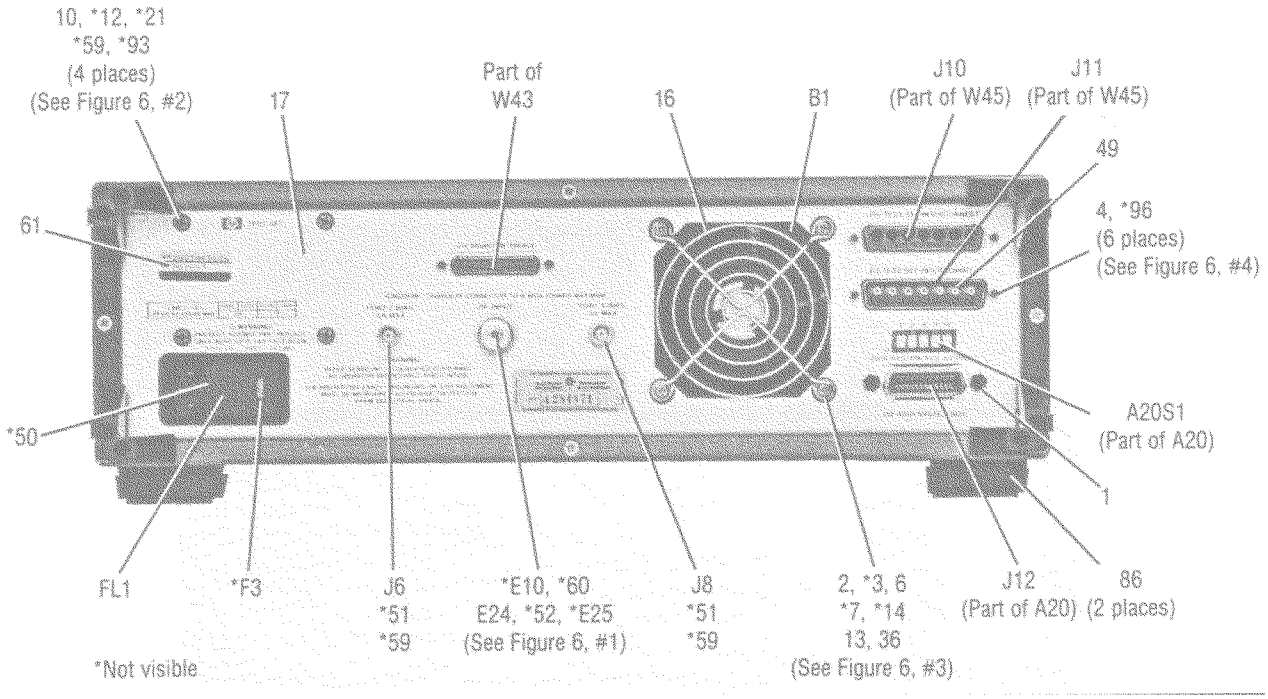

10, *12, *21
*59, *93
(4 places)
(See Figure 6, #2)
17
Part of
W43
16
B1
J10
(Part of W45)
J11
(Part of W45)
49
4, *96
(6 places)
(See Figure 6, #4)
61
*50
A20S1
(Part of A20)
1
FL1
*F3
J6
*51
*59
*E10, *60
E24, *52, *E25
(See Figure 6, #1)
J8
*51
*59
2, *3, 6
*7, *14
13, 36
(See Figure 6, #3)
J12
(Part of A20)
86
(2 places)
*Not visible

Table 6-5 Rear View, External

Reference Designation	HP Part Number	Qty	Description
REAR VIEW, EXTERNAL			
B1	08513-20031	1	FAN-TBAX 34-CFM 115V 50/60-HZ 1.5KVDIEL
E10	08613-20016	1	GOLD NOSE CONNECTOR
E24	5061-5394	1	PIN AND BEAD ASSEMBLY
E25	08513-20017	1	BULKHEAD CONNECTOR
F3	2110-0002	1	FUSE 2.0A 250V NTD 1.25X.25 UL
FL1	9135-0217	1	LINE MODULE-FILTERED
J6	1250-0083	2	CONNECTOR-RF BNC FEM SGL-HOLE-FR 50-OHM
J8	1250-0083		CONNECTOR-RF BNC FEM SGL-HOLE-FR 50-OHM
J10	1251-2197	1	CONNECTOR R&P 24F
J11	1251-2204	1	CONNECTOR R&P 24M
1	0380-0643	2	STANDOFF-HEX.255-IN-LG 6-32 THD
2	0400-0002	4	GROMMET-RND.188-IN-ID.312-IN-GAV-OD
3	0590-0926	4	THREADED INSERT-STDF 6-32.188-IN-LG SST
4	1251-7812	6	CONNECTOR JACKSCREW
6	2360-0123	4	SCREW-MACH 6-32.625-IN-LG PAN-HD-POZI
7	2420-0001	4	NUT-HEX-WILKWR 6-32-THD.109-IN-THK
10	2510-0270	4	SCREW-MACH 8-32 3.25-IN-LG PAN-HD-POZI
12	3050-0139	12	WASHER-FL MTLC NO.8 .172-IN-ID
13	3050-0152	4	WASHER-SHLDR NO.8 .172-IN-ID .438-IN-OD
14	3050-0227	4	WASHER-FL MTLC NO.6 .149-IN-ID
16	3160-0309	1	FINGER GUARD
17	08516-00003	1	REAR PANEL
21	2190-0017	4	WASHER-LK INTL NO.10 .195-IN-ID
36	08513-00002	1	TRANSFORMER BRACKET
49	5021-0906	14	TEFLON CABLE SLEEVE
50	5001-3907	2	LINE MODULE RETAINER CLIPS
51	2190-0016	2	WASHER-LK INTL T 3/8 IN .377-IN-ID
52	2190-0104	5	WASHER-LK INTL T 7/16 IN .439-IN-ID
59	2950-0001	2	NUT-HEX-DBL-CHAM 3/8-32-THD .094-IN-THK
60	2950-0132	5	NUT-HEX-DBL-CHAM 7/16-28-THD .094-IN-THK
61	7121-2380	1	LABEL-SERIAL NUMBER
86	5041-8821	2	FOOT-REAR
93	0380-0010	4	SPACER-RND.625-IN-LG .18-IN-ID
96	0590-0663	6	NUT-HEX 4/40

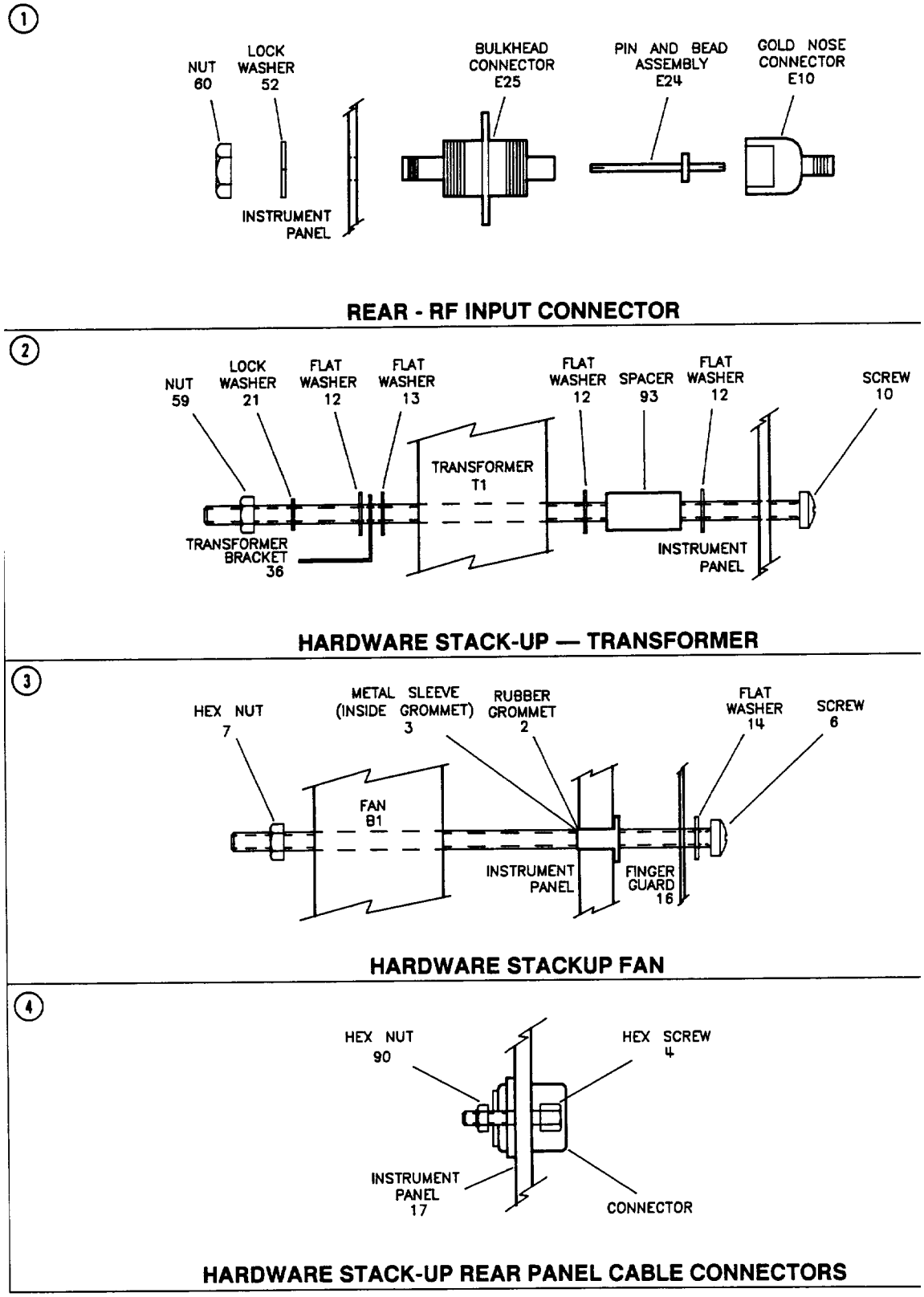


Figure 6-7 Detailed Views

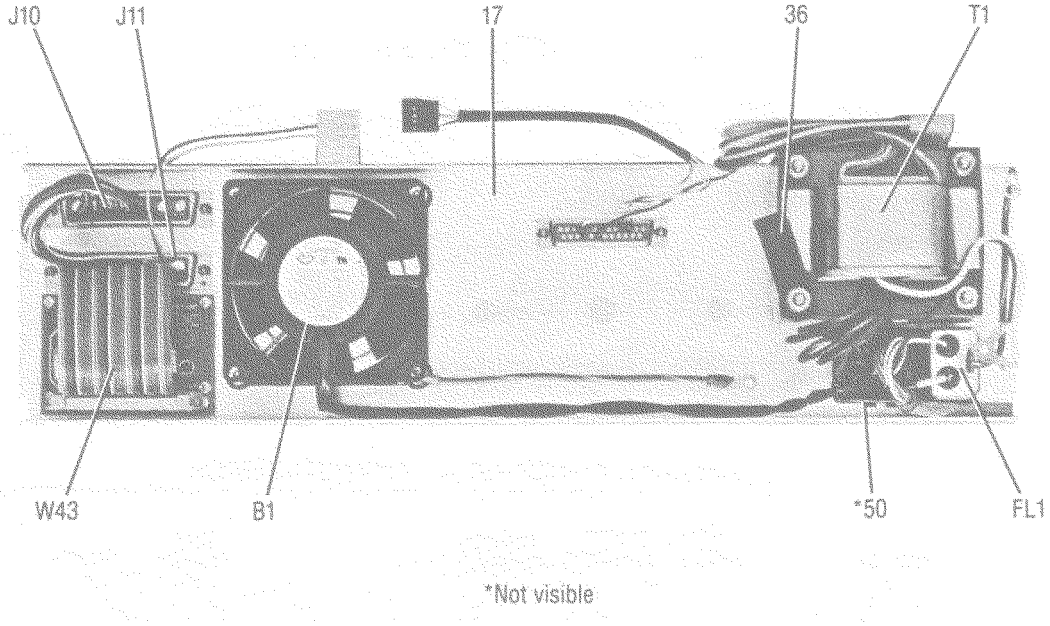


Figure 6-8 Rear View, Internal

Table 6-6 Rear View, Internal

Reference Designation	HP Part Number	Qty	Description
REAR INTERNAL			
B1	08513-20031	1	FAN TBAX 34-CFM 115V 50/60 HZ 1.5KVDIEL
FL1	9135-0217	1	LINE MODULE FILTERED
J10	1251-2197	1	CONNECTOR R&P 24F
J11	1251-2204	1	CONNECTOR R&P 24M
T1	5181-0124	1	POWER, TRANSFORMER
W43	08516-60006	1	CA ASSY A21 TO REAR PANEL

Table 6-6 Rear View, Internal

Reference Designation	HP Part Number	Qty	Description
17	08516-00003	1	REAR PANEL
36	08513-00002	1	TRANSFORMER BRACKET
50	5001-3907	2	LINE MODULE RETAINER CLIPS

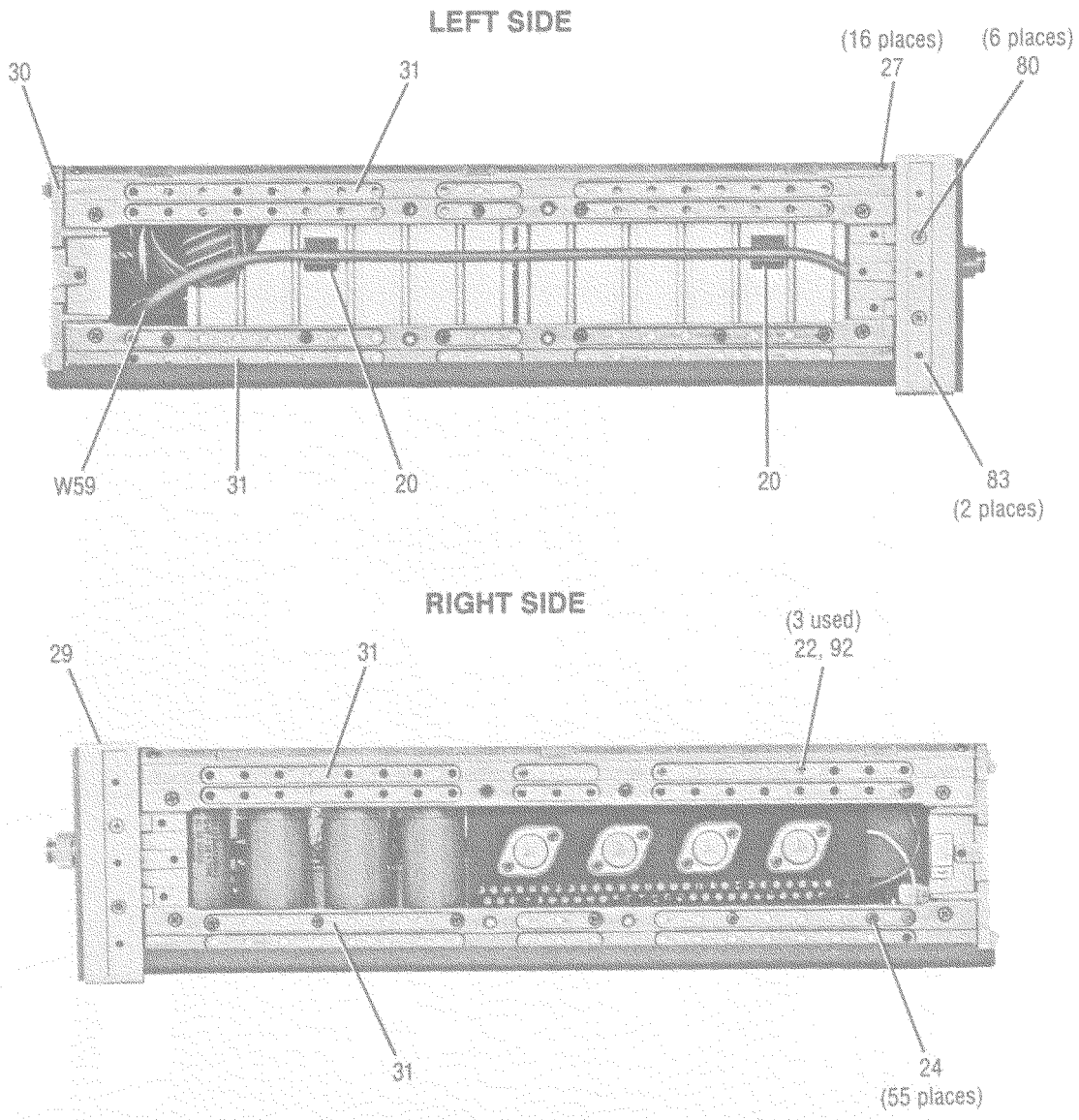


Figure 6-9 Detailed View, Right and Left

Table 7 Detailed View, Right and Left

Reference Designation	HP Part Number	Qty	Description
		LEFT AND RIGHT SIDES	
W59	85102-60226	1	CABLE ASSY LINE SWITCH
20	1400-0757	2	CLAMP CABLE .25 DIA 1-WD PVC
22	2200-0105	13	SCREW MACH 4-40 .312IN LG PAN HD POZI
24	2360-0115	62	SCREW MACH 6-32 .312IN LG PAN HD POZI
27	0515-1367	16	SMM 4.0 8 GL PD
29	5021-5803	1	FRAME FRONT
30	5021-5804	1	FRAME REAR
31	5021-5837	4	STRUT CORNER 18”

Table 7 Detailed View, Right and Left

Reference Designation	HP Part Number	Qty	Description
80	0515-0396	6	SMM 4.0 10 FL PD
83	5020-8896	2	TRIM FRNT HNDL
92	3050-0105	3	WASHER FL MTLC NO.4 .125 IN ID

Figure 6-10 Miscellaneous Mechanical and Electrical Parts, Top

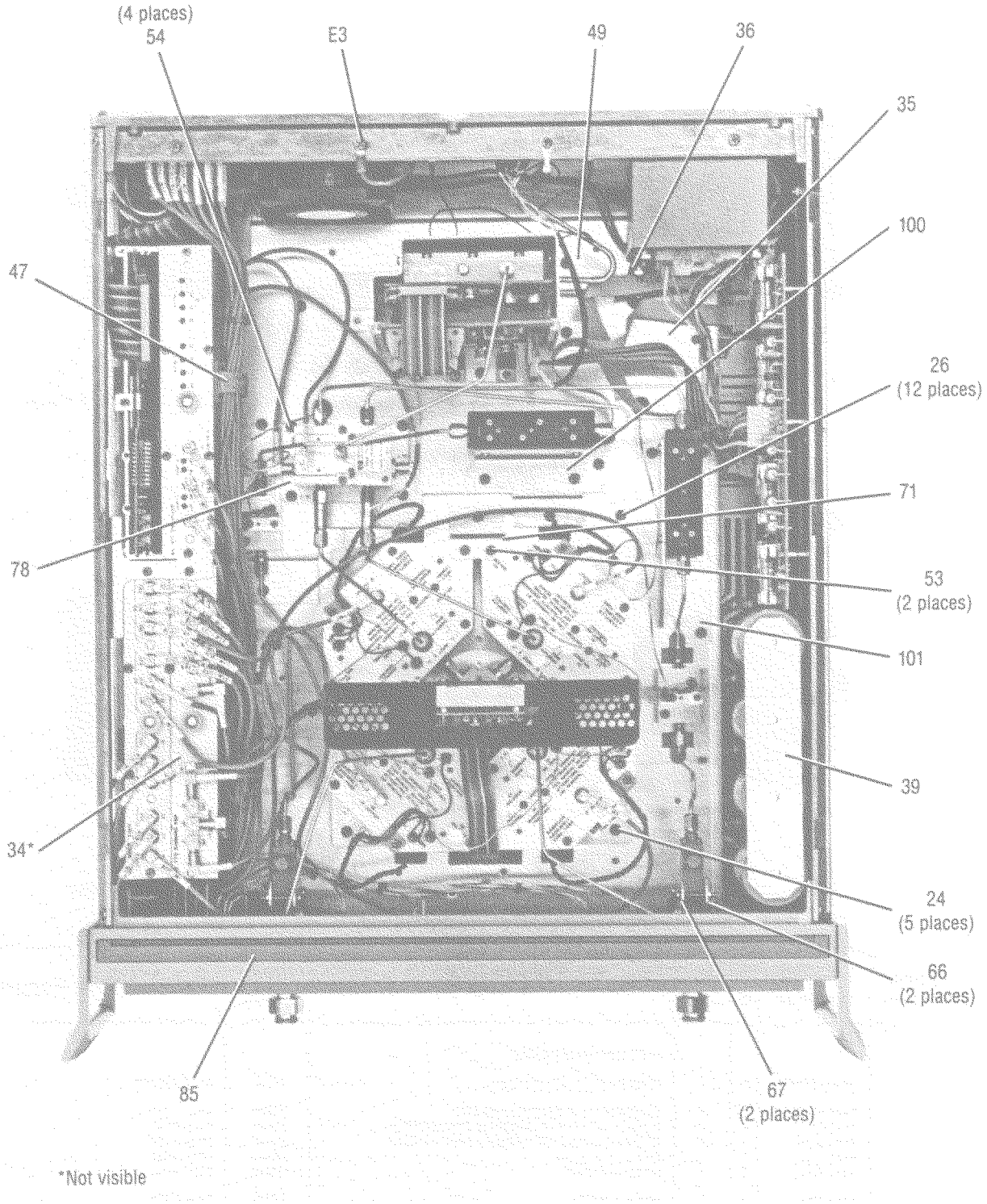

(4 places)
54
E3
49
36
35
100
47
26
(12 places)
71
78
53
(2 places)
101
39
34*
24
(5 places)
66
(2 places)
85
67
(2 places)
*Not visible

Table 6-8 Miscellaneous Mechanical and Electrical Parts, Top

Reference Designation	HP Part Number	Qty	Description
MISCELLANEOUS PARTS (TOP)			
E3	0360-0031		TERMINAL CRIMP R TNG #6 22-16 AWG RED
24	2360-0115	5	SCREW MACH 6-32 .312 IN LG PAN HD POZI
26	2360-0333	12	SCREW MACH 6-32 .25-IN-LG 100 DEG.
34	08512-20005	1	RFI GASKET
35	08513-00001	1	MAIN DECK
36	08513-00002	1	TRANSFORMER BRACKET
39	08513-00015	1	CAP APRT PLATE
47	1400-1209	1	CLP CA .69D 1.0W
49	08516-00015	1	TOP DECK
53	2200-0109	2	SCREW MACH 4-40 .438 IN LG PAN HD POZI
54	2200-0164	4	SCREW MACH 4-40 .188 IN LG UNCT 82 DEG
66	08516-00010	2	COUPLER CLAMP
67	08516-00009	2	COUPLER SUPPORT
71	08513-00017	2	BRACKET-CONV ASSY
78	08514-00007	1	SWITCH SPLITTER MOUNTING PLATE
95	5040-7202	1	STRIP TRIM TOP
100	08516-00014	1	ATTENUATOR MOUNTING PLATE
101	08516-00013	1	ATTENUATOR MOUNTING PLATE

Figure 6-11 Miscellaneous Mechanical and Electrical Parts, Bottom

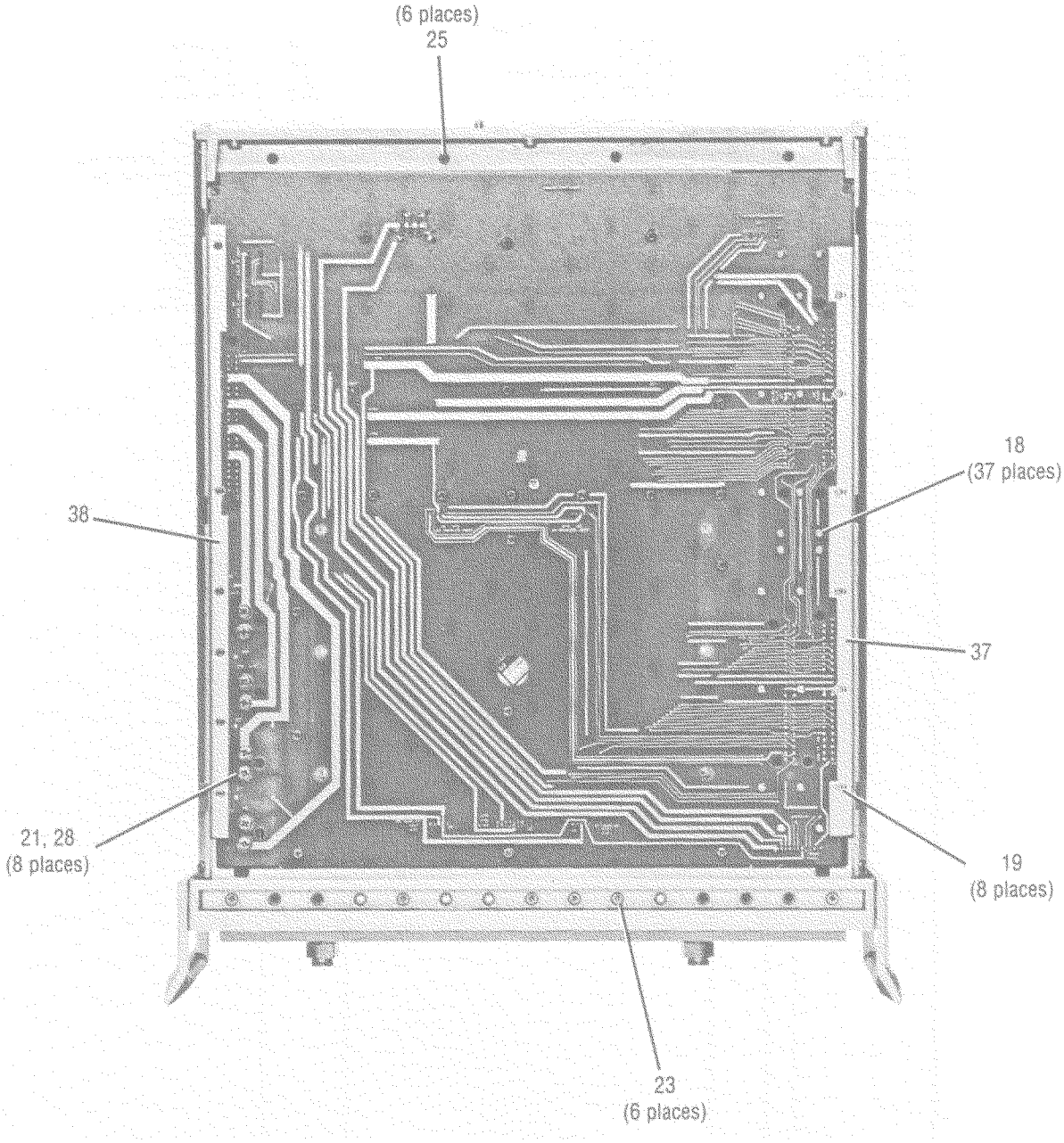
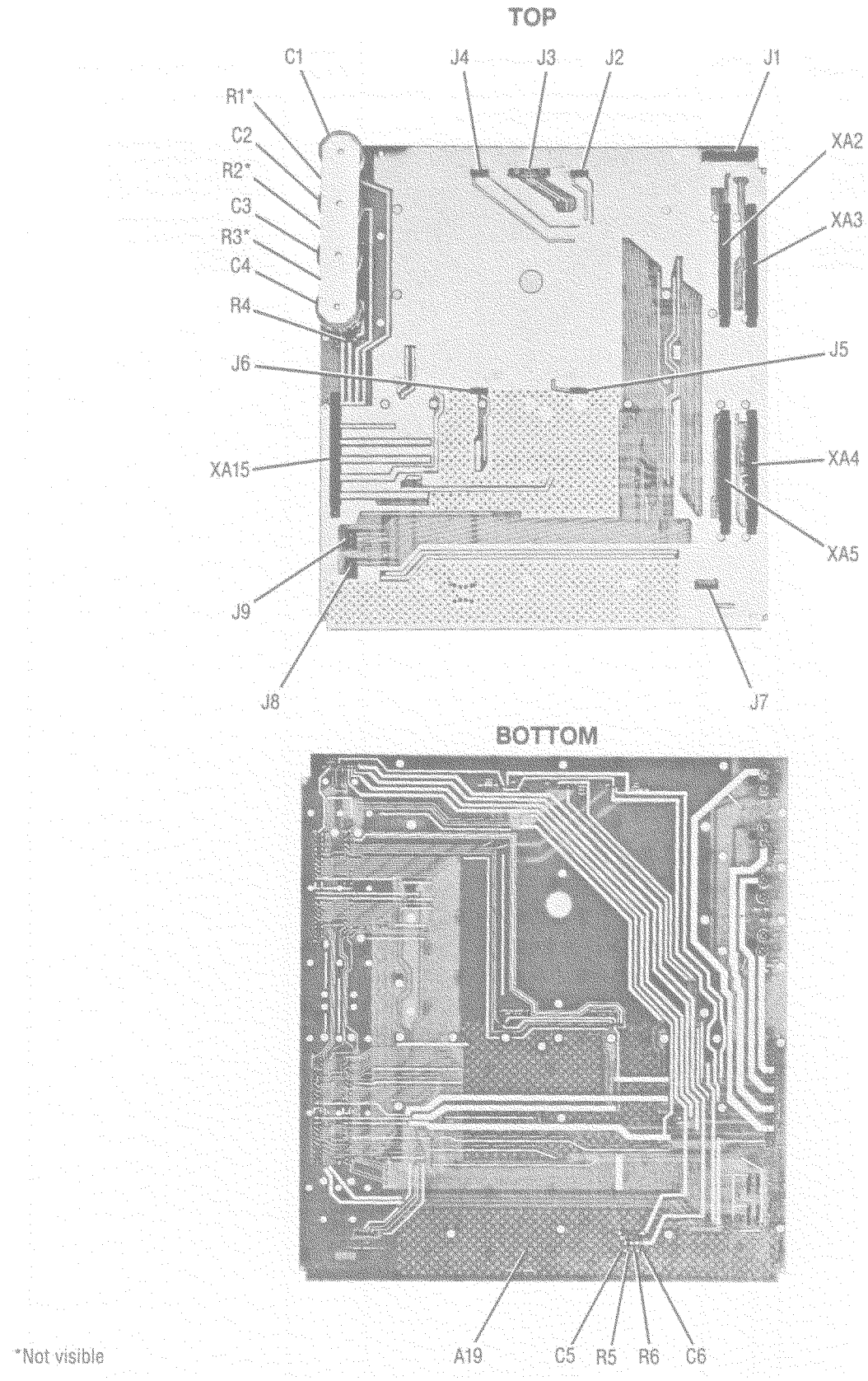

(6 places)
25
18
(37 places)
38
37
21, 28
(8 places)
19
(8 places)
23
(6 places)

Table 6-9 Miscellaneous Mechanical and Electrical Parts, Bottom

Reference Designation	HP Part Number	Qty	Description
MISCELLANEOUS PARTS (BOTTOM)			
18	0624-0099	37	SCREW TPG 4-40 .375 IN LG PAN HD POZI
19	0624-0100	8	SCREW TPG 4-40 .5 IN LG PAN HD POZI STL
21	2190-0011	8	WASHER LK INTL T NO.10 .195 IN ID
23	2200-0165	14	SCREW MACH 4-40 .25 IN LG 82 DEG
26	2360-0119	6	SCREW MACH 6-32 .438 IN LG PAN HD POZI
28	2680-0129	8	SCREW MACH 10-32 .312 IN LG PAN HD POZI
37	08513-00005	1	MTG BRACKET LH
38	08513-00006	1	MTG BRACKET RH

Figure 6-12 Motherboard Parts


TOP
C1
J4
J3
J2
J1
R1*
C2
R2*
C3
R3*
C4
R4
XA2
XA3
J6
J5
XA15
XA4
XA5
J9
J8
J7
BOTTOM
A19
C5
R5
R6
C6

*Not visible

Table 6-10 Motherboard Parts

Reference Designation	HP Part Number	Qty	Description
A19	08513-60001	1	BOARD ASSEMBLY, MOTHER THE FOLLOWING PARTS ARE NOT SUPPLIED WHEN A19 IS ORDERED: A19C1, A19C2, A19C3, A19C4
A19C1	0180-2671	4	CAPACITOR-FXD .012F +75-10% 30VDC AL
A19C2	0180-2671		CAPACITOR-FXD .012F +75-10% 30VDC AL
A19C3	0180-2671		CAPACITOR-FXD .012F +75-10% 30VDC AL
A19C4	0180-2671		CAPACITOR-FXD .012F +75-10% 30VDC AL
A19C5-C6	0160-4834	2	CAPACITOR-FXD .047UF ±10% 100VDC CER
A19J1	1251-5745		CONNECTOR 20-PIN M POST TYPE (A19J1 DOES NOT INCLUDE A19MP1 & A19MP2)
A19J2	1251-6868	4	CONNECTOR 5-PIN M POST TYPE
A19J3	1251-7939	1	CONN-POST TYPE .100-PIN-SPCG 14-CONT (A19J3 DOES NOT INCLUDE A19MP3)
A19J4	1251-6868		CONNECTOR 5-PIN M POST TYPE
A19J5	1251-6868		CONNECTOR 5-PIN M POST TYPE
A19J6	1251-6868		CONNECTOR 5-PIN M POST TYPE
A19J7	1251-3825	1	CONNECTOR 5-PIN M POST TYPE
A19J8	1200-0508	2	SOCKET-IC 14-CONT DIP-SLDR
A19J9	1200-0508		SOCKET-IC 14-CONT DIP-SLDR
A19R1	0764-0015	2	RESISTOR 560 5% 2W MO TC = 0 ±200
A19R2	0764-0015		RESISTOR 560 5% 2W MO TC = 0 ±200
A19R3	0764-0016	2	RESISTOR 1K 5% 2W MO TC = 0 ±200
A19R4	0764-0016		RESISTOR 1K 5% 2W MO TC = 0 ±200
A19R5	0757-0394		RESISTOR 51.1 1% .125W F TC = 0 ±100
A19R6	0757-0394		RESISTOR 51.1 1% .125W F TC = 0 ±100
A19XA2	1251-7882	5	CONNECTOR-PC EDGE 2-ROWS
A19XA3	1251-7882		CONNECTOR-PC EDGE 2-ROWS
A19XA4	1251-7882		CONNECTOR-PC EDGE 2-ROWS
A19XA5	1251-7882		CONNECTOR-PC EDGE 2-ROWS
A19XA6- A19XA14			NOT ASSIGNED
A19XA15	1251-7882		CONNECTOR-PC EDGE 2-ROWS

Figure 6-13 Parts Unique to Option 003

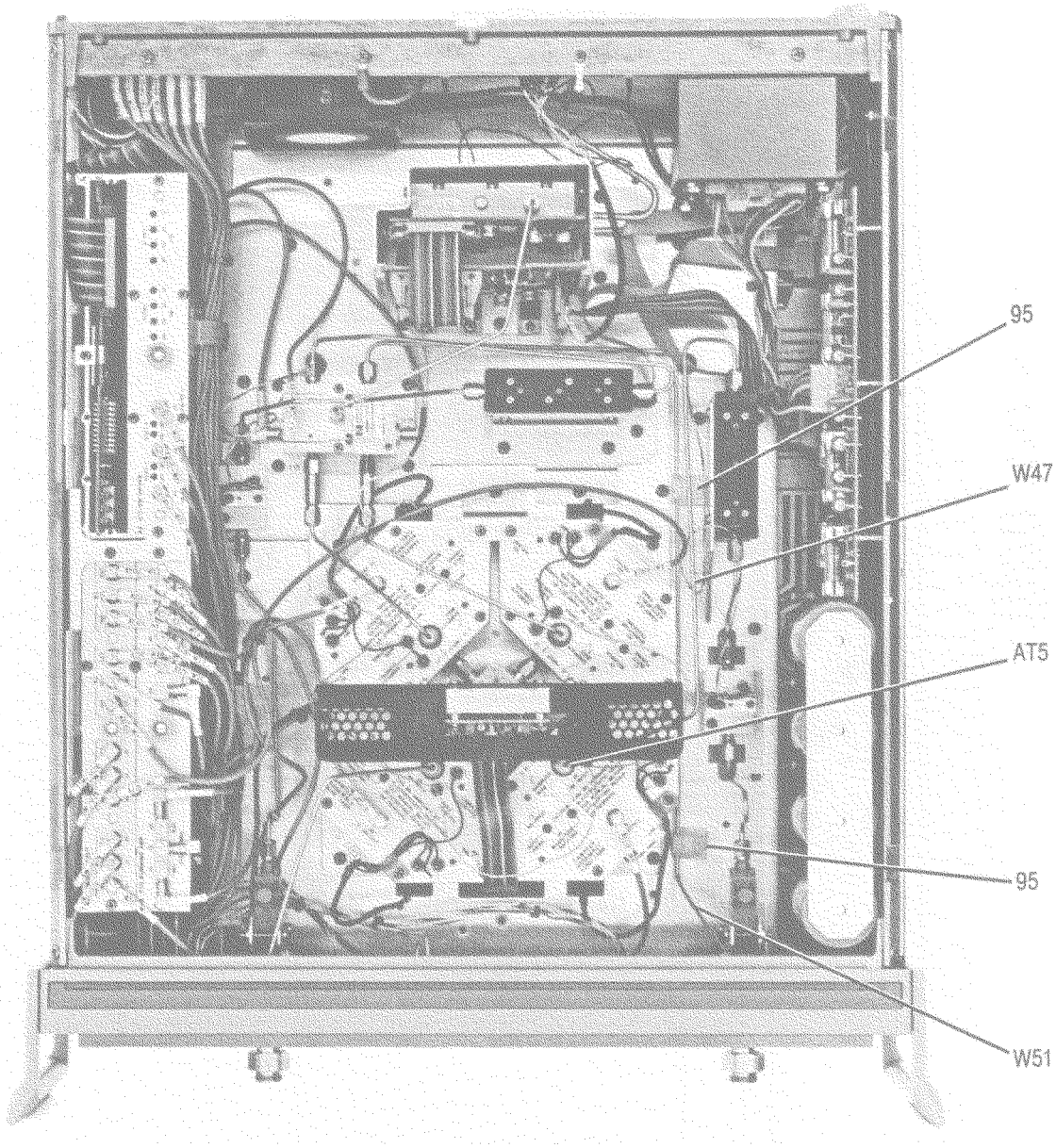

95
W47
AT5
95
W51

Table 6-11 Parts Unique to Option 003

Reference Designation	HP Part Numer	Qty	Description
PARTS UNIQUE TO OPTION 003			
W47	08516-20025	1	CA ASSEMBLY A17 TO B2 SAMPLER
W51	08516-20031	1	CA ASSEMBLY A8 TO A18
AT5	08516-60020	1	2.4MM 3dB ATTENUATOR
95	1400-1470	2	CABLE CLAMP

Figure 6-14 Parts Unique to Option 001

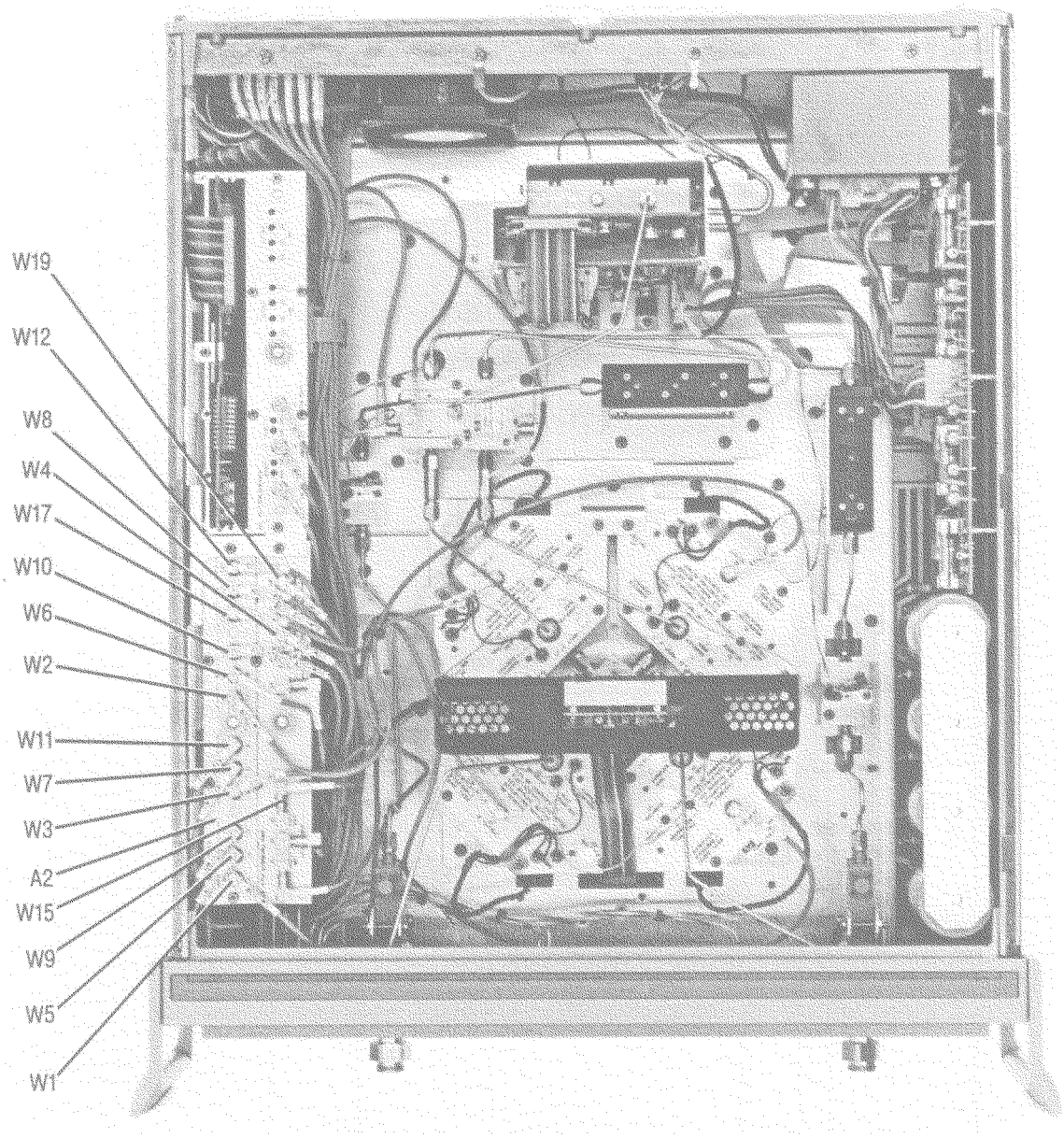

W19
W12
W8
W4
W17
W10
W6
W2
W11
W7
W3
A2
W15
W9
W5
W1

Table 6-12 Parts Unique to Option 001

Reference Designation	HP Part Number	Qty	Description
PARTS UNIQUE TO OPTION 001			
A2	08513-60004	1	BD ASSY, IF MULTIPLEXER (NEW)
A2	08513-69004	1	BD ASSY, IF MULTIPLEXER (REBUILT)
W1	08513-60121	1	CA AY A12J3 TO A2J1
W2	08513-60122	1	CA AY A13J3 TO A2J7
W3	08513-60123	1	CA AY A10J3 TO A2J4
W4	08513-60124	1	CA AY A11J3 TO A2J10
W5	08513-60125	1	CA AY A2J2 TO J11A1
W6	08513-60126	1	CA AY A2J8 TO J11A4
W7	08513-60127	1	CA AY A2J5 TO J11A2
W8	08513-60128	1	CA AY A2J11 TO J11A3
W9	08513-60129	1	CA AY A2J3 TO J10A1
W10	08513-60130	1	CA AY A2J9 TO J10A4
W11	08513-60131	1	CA AY A2J6 TO J10A2
W12	08513-60132	1	CA AY A2J12 TO J10A3
W13-W14			NOT UNIQUE TO OPTION 001
W15	08513-60135	1	CA AY A3J3 TO J10A7
W16			NOT UNIQUE TO OPTION 001
W17	08513-60137	1	CA AY A3J6 TO J10A5
W18			NOT UNIQUE TO OPTION 001
W19	08513-60139	1	CA AY A3J8 TO J10A6

Figure 6-15 Parts Unique to Option 002

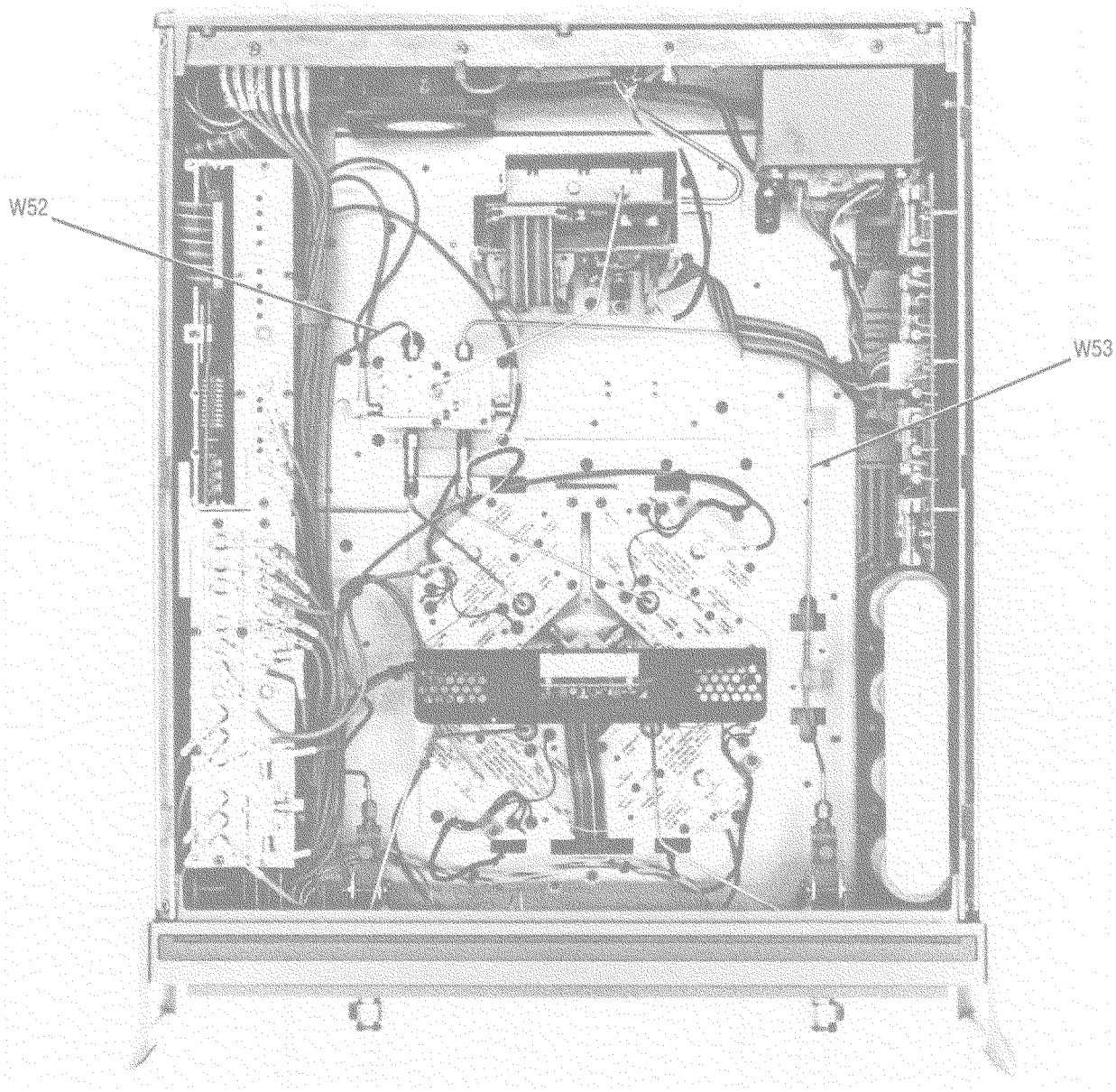

W52
W53

Table 6-13 Parts Unique to Option 002

Reference Designation	HP Part Number	Qty	Description
W52	08516-20033	1	CA ASSEMBLY A8 TO A18
W53	08516-20032	1	CA ASSEMBLY A18 TO A6

Figure 6-16 Parts Unique to Options 002 and 003

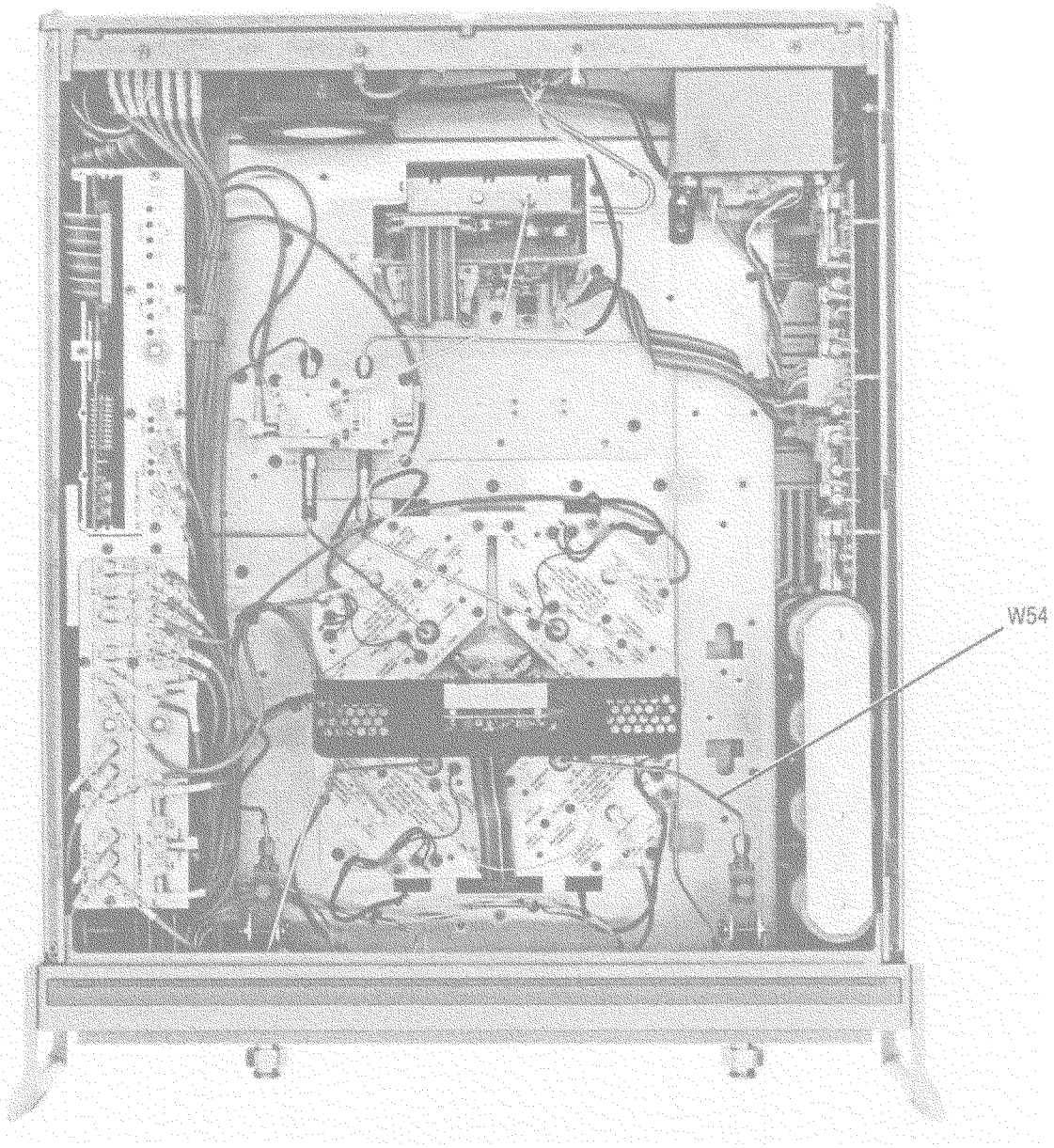

W54

Table 6-14 Parts Unique to Options 002 and 003

Reference Designation	HP Part Number	Qty	Description
W54	08516-20030	1	CA ASSEMBLY A8 TO B2 SAMPLER

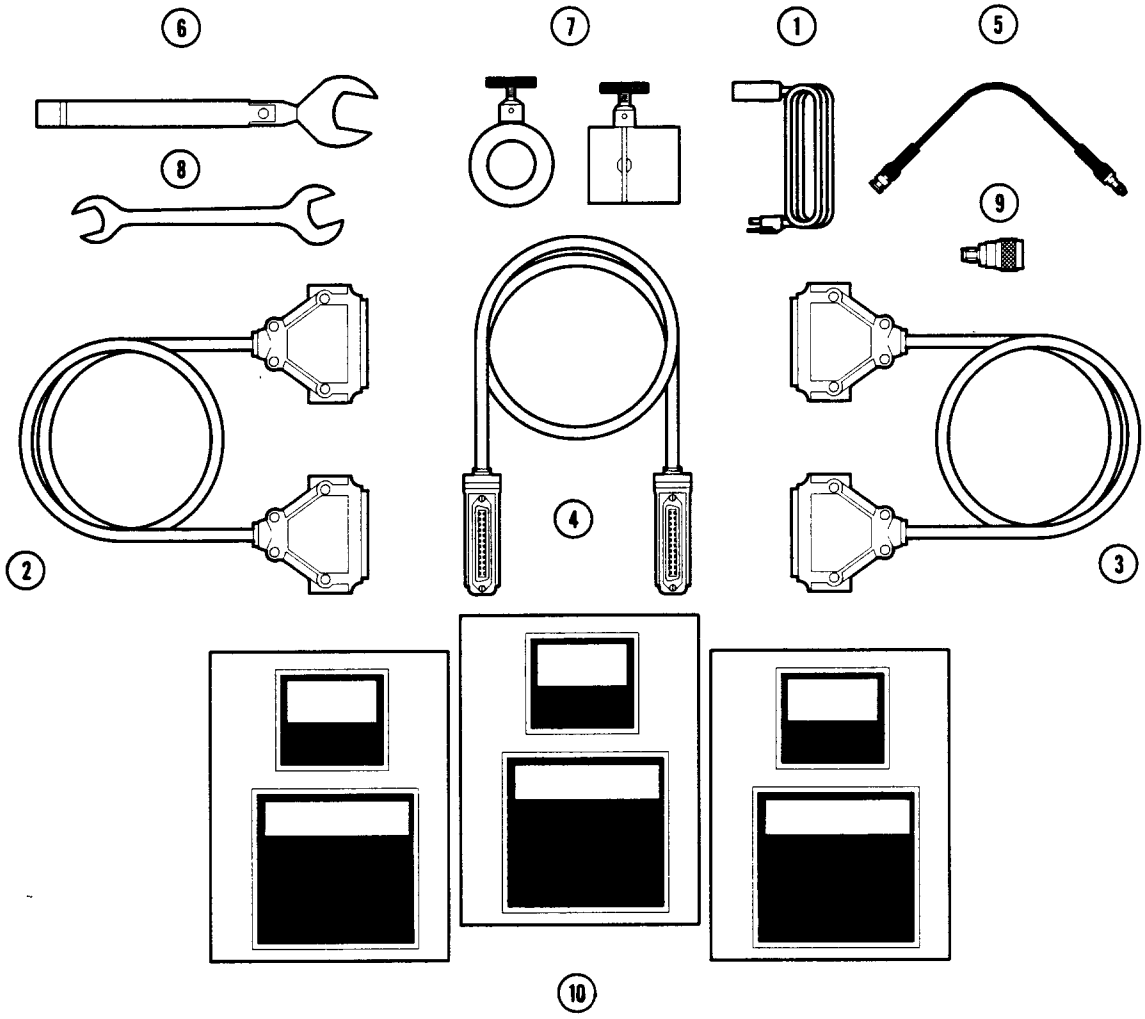


Figure 6-17 Accessories

Table 6-15 Accessories

Reference Designation	HP Part Number	Qty	Description
ACCESSORIES			
1	8120-1348	1	POWER CORD U.S.A. ONLY
2	08510-60102	1	TEST SET CABLE ASSEMBLY
3	08516-60009	1	CABLE ASSEMBLY, RS232
4	8120-3445	1	HP-IB CABLE ASSEMBLY
5	08513-60009	1	RF FLEX SOURCE CABLE
6	8710-1764	1	20 MM TORQUE WRENCH 90 N-CM (8 IN-LB)
7	08515-60003	2	NON-ROTATING CLAMP
8	8710-1770	1	1/2 X 9/16 IN OPEN END WRENCH
9	1250-1894	1	ADAPTER MALE N TO MALE SMA

Table 6-15 Accessories

Reference Designation	HP Part Number	Qty	Description
SPECIFICATION AND PERFORMANCE VERIFICATION SOFTWARE			
10	08510-10031	2	PROGRAM DISKS
	08510-10032	1	DATA DISK

7

Service

This HP 8516A Service section consists of a wiring diagram keyed to Figure 7-1, the component location diagram of the motherboard (Al9), RF and Control Block Diagrams for the HP 8516A. Use these tools as aids to troubleshoot motherboard trace and component problems.

Other service information is included in the Test Set Troubleshooting sections of the *HP 8510B Service Manual* and this manual. Topics covered include checks of the major assemblies and assembly removal procedures, and RF troubleshooting procedures.

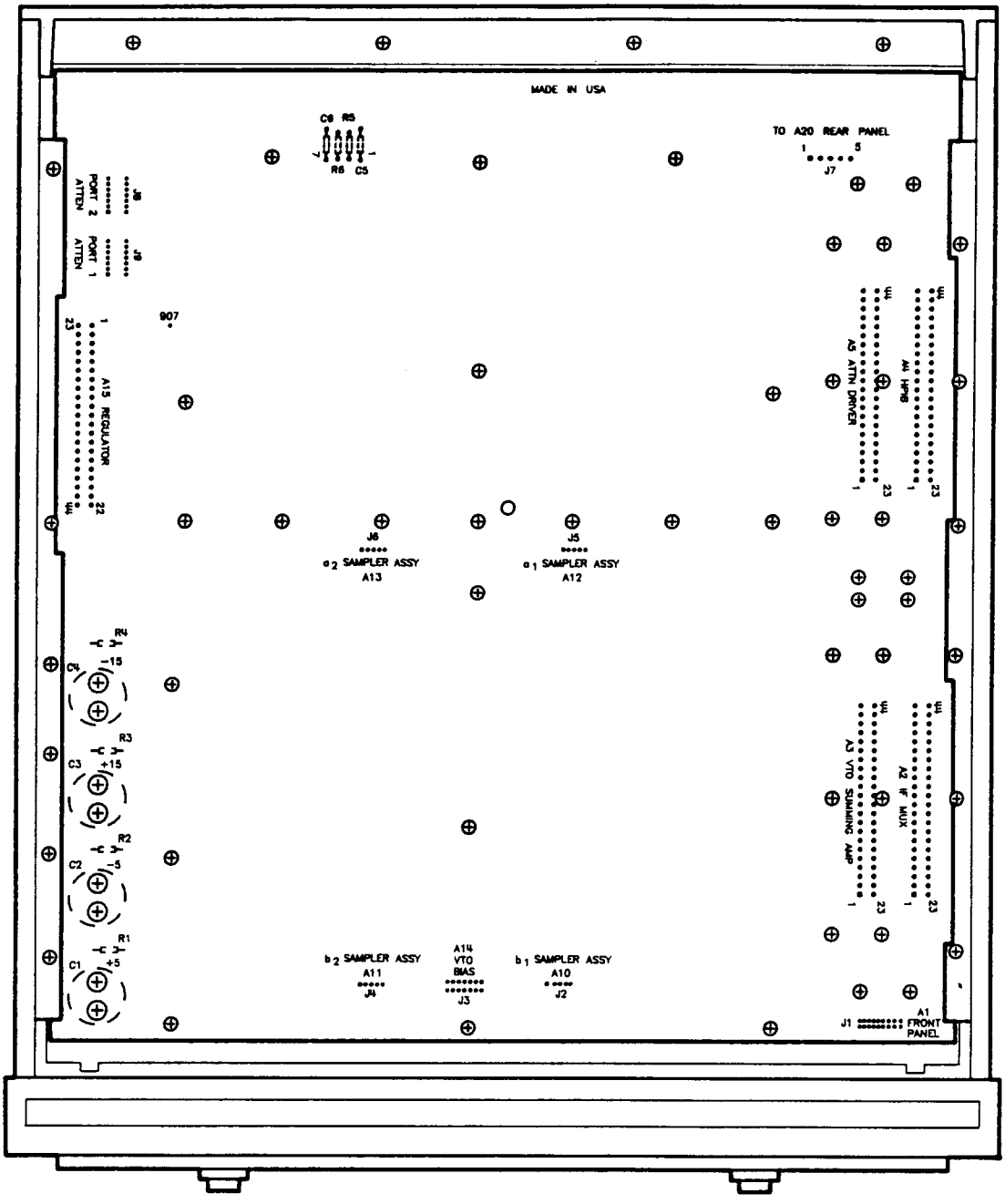
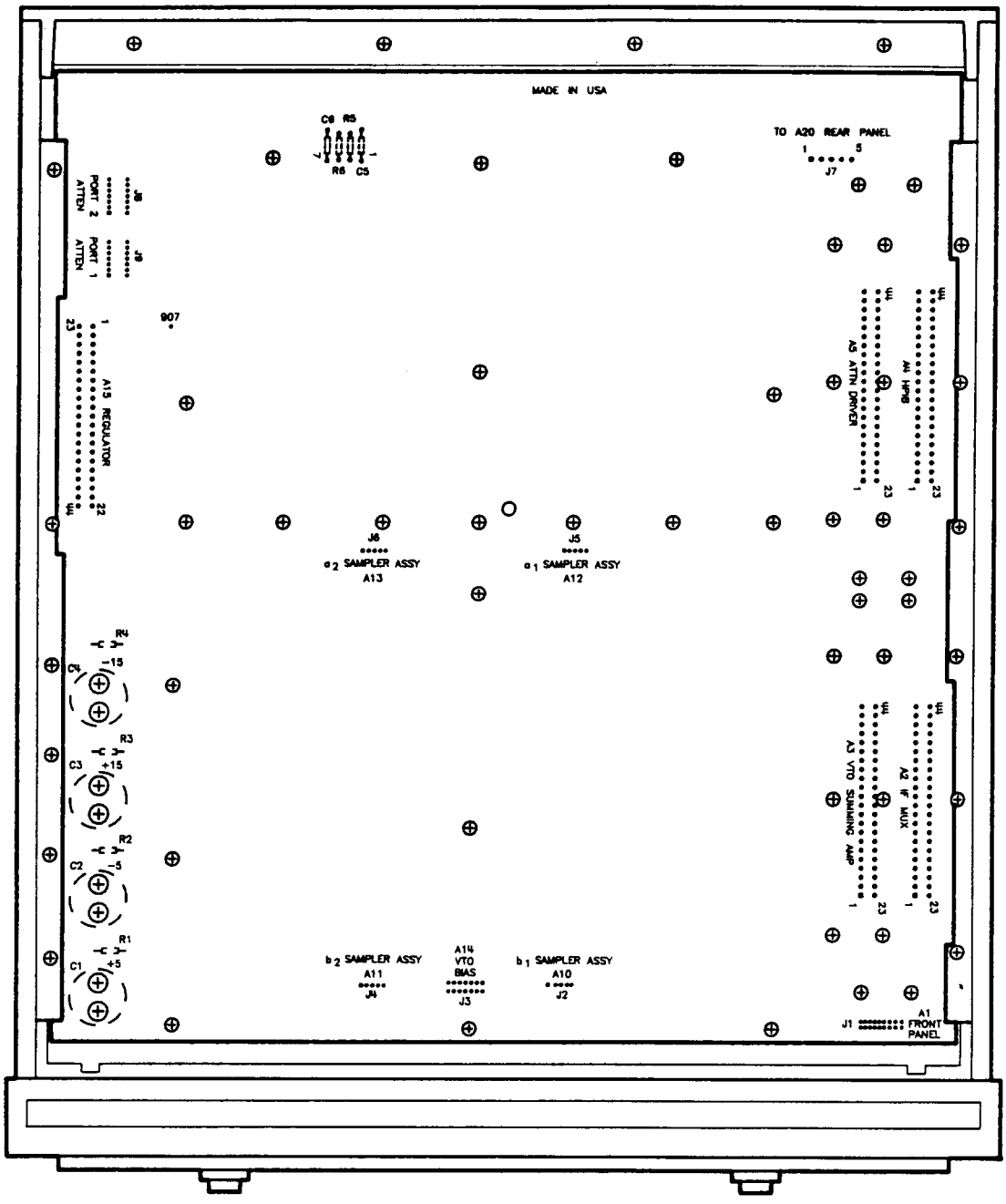


Figure 7-1 HP 8516A Motherboard

Figure 7-2 HP 8516A Motherboard


MADE IN USA
C6 R5
R6 C5
TO A20 REAR PANEL
J7
PORT 2 ATTEN
PORT 1 ATTEN
907
A13 REGULATOR
A5 ATTN DRIVER
A4 HPIB
J6
a2 SAMPLER ASSY
A13
J5
a1 SAMPLER ASSY
A12
R4
C4
+15
R3
C3
+15
R2
C2
-5
R1
C1
+5
A3 VTO SUMMING AMP
A2 IF MUX
b2 SAMPLER ASSY
A11
J4
A14
VTO
BIAS
J3
b1 SAMPLER ASSY
A10
J2
J1
A1
FRONT
PANEL

8

Miscellaneous

Performance Tests

Performance test information and procedures are located in the Performance Tests section of the *HP 8510B System Manual*. Note that the HP 8510B performance test software (supplied with the test set) is required to test the HP 8516A. Performance test results are based on the HP 8510 system, including the test set, cables, calibration kit, etc.

Adjustments

The HP 8516A has no adjustments. Specifically, no attempt should be made to adjust the samplers, as is done in other Hewlett-Packard test sets.

Manual Backdating

Manual backdating is not required for this manual set. This manual applies directly to instruments with the same (or lower) serial number prefix indicated on the title page. Instruments with serial number prefixes higher than in the front of this manual may be documented in a manual update supplement.